GABBE, Isa U. M.A. German

Kurd Lasswitz' Novel Auf zwei Planeten (1897).

Kurd Lasswitz' Novel Auf zwei Planeten (1897), An Analysis of an Early Work of German Science Fiction

Isa Ulrike Gabbe

A thesis submitted to the Faculty of Graduate Studies and Research of McGill University in partial fulfillment of the requirements for the degree of Master of Arts in German.

November 1976

ABSTRACT

This study provides a mainly thematic analysis of an early work of German science fiction, the novel Auf zwei Planeten (1897) by Kurd Lasswitz.

Science fiction (SF) is a relatively new literary genre that constitutes a response to the technological advances made since the Industrial Revolution. It can be defined by three elements--science, the sense of wonder and the notion of change. Its history is very complex because of the emergence of different kinds of science fiction.

Lasswitz' early work of SF is based on late 19th century speculations about Mars, an optimistic belief in science--typical for Germany at that time--and German idealistic philosophy. The analysis covers Lasswitz' fascinating scientific and technological extrapolations, the planet Mars, the Martians with their high Kantian ethics, the savage humans and the main characters. The novel exhibits several deficiencies, but its originality lies in its main theme that science and technology are a means for the ethical improvement of mankind.

RÉSUMÉ

Cette étude contient une analyse surtout thématique d'une oeuvre qui marque les débuts de la science fiction allemande, le roman Auf zwei Planeten écrit en 1897 par Kurd Lasswitz.

La science fiction (SF) est un genre relativement récent qui constitue une réponse au progrès technologique accompli depuis la révolution industrielle. Elle peut être définie par trois éléments: la science, l'émerveillement et la notion de changement. Son histoire est très complexe à cause de l'émergence de différentes sortes de SF.

Le roman de Lasswitz a été influencé par les spéculations contemporaines sur Mars, l'optimisme par rapport à la science--typique pour l'Allemagne à cette époque--et la philosophie idéaliste allemande. Notre analyse portera sur les points suivants: les remarquables extrapolations scientifiques et technologiques de Lasswitz, la planète Mars, les Martiens et leur éthique kantienne, les humains sauvages et les personnages principaux. Le roman a plusieurs faiblesses, mais son originalité découle du thème principal que la science et la technologie sont des moyens pour l'humanité d'accéder à un niveau éthique supérieur.

PREFACE

In the first version of this thesis the part on science fiction (SF) was much more elaborate, but following the advice of Professor Arnold, my thesis supervisor, and Professor Suvin it has been greatly reduced. Due to my stay in Germany, I was able to deepen my understanding of Lasswitz since the material was more readily available here. In addition to this, I was fortunate enough to benefit from the advice of an expert on SF, Dr. Franz Rottensteiner, who provided me with valuable secondary sources on Lasswitz.

My grateful thanks go to Professor Arnold for his patience in supervising a thesis that was written on two continents. I am also indebted to two SF fans: Jacques Gagnon for having given me the idea of writing about SF, and Gilles Caron for his encouragement and typing aid.

West Berlin, Germany

OUTLINE

This book is offered in the belief that to read, and to study, science fiction are valid and interesting pursuits from any old point of view, whether literary, sociological, psychological, political, or what you will...

Amis: New Maps of Hell [1]

I. AN INTRODUCTION TO SCIENCE FICTION

A. A New Literary Genre

History and literature are two fields influencing each other, so that it is not surprising that a deep change in Western society--the Industrial Revolution--gave birth to a new literary genre: science fiction (SF). Isaac Asimov, one of the major writers of this genre, sees a clear causal relationship between the two: "Technological advance, rapid with respect to the passing of the generations, is a new factor in human history, a factor that marks off the last few generations of mankind from all the generations that preceded, and science fiction is the literary response to that new factor." [2]

The importance and quality of this new literary field is as much disputed as any given definition of it. For a first basic understanding of SF, Theodore Sturgeon's definition--on which there is wide agreement--will be used: "A good science fiction story is a story with a human problem, and a human solution, which would not have happened at all without its science content." [3]

Thus, science is one of the elements in SF. In its two

extremes, science is looked at either with optimism (see Jules Verne and his followers) or with deep distrust (see H. G. Wells and his successors). John W. Campbell stresses that a beneficial use of science is only possible through wise decisions of men:

> ...science should be recognized for what it is: mankind's rebellion against the world as it is. Science is an effort to make the world become what the idealist wishes it were. ... Once, man depended on magic. ... Science took its place. ...science is simply that which works. ...as a result, [it is] inhuman,...utterly unsuited to mankind... A magic freed of motives, science is [nonetheless] capable of serving mankind, but something outside of science must determine what that service can be and should be and might be. [4]

Science fiction, then, is an attempt to show how science--and by extension technology--may one day influence man and society.

Another important element in SF is the "sense of wonder." William Atheling, Jr. (pseudonym for James Blish) describes it as a kind of "childishness not in its innocence, but in its sinister and amoral sides" and gives a vivid example:

> ...when I was just going into adolescence, one of my favorite daydreams was one in which I would suddenly arrive over the Earth in a mile-long spaceship, which would become a permanent fixture of the skies and from which I would rule all the world as invincible overlord, proving to the teachers who had failed me and the girls who had scorned me that I was a person of substance after all... The invisibility fantasy is another such notion. ...these semi-erotic, semi-irresponsible daydreams...do have functions of their own, of which the purgative is only one... They also speak for the gratifications which we really hope to find in life... Science fiction has always spoken for these daydreams. [5]

But the sense of wonder is more than sinister or amoral wishful daydreaming, it is also contained in what Kornbluth once called the "things that mean science fiction:" "Vast spaces, strange inventions, great voyages, heroes incredible, villains satanic, monsters, strangeness." [6] In fact, throughout the last decades, editors of many SF magazines have attempted to attract readers by linking their magazines' names with this sense of wonder: Science Wonder Stories, Astounding Stories, Amazing Stories, Startling Stories, Weird Tales, Tales of Wonder, Fantasy Magazine, Unknown, New Worlds, Comet, Planet, Galaxy, If and Fantasy and Science Fiction.

Closely related to the two elements of science and wonder is the factor of change. As Campbell explains: "...science fiction is the literature of speculation as to what changes may come, and which changes will be improvements, which destructive, which merely pointless." [7] Sam Lundwall praises SF for the element of change which differentiates this field from other literary genres: "Science fiction stands out by its ability to cope with the changes of environment, values and conduct..." [8] SF writers and readers may accept change, but society in general resists change and therefore also SF, as Campbell proposes: "Society changes with enormous reluctance; it abhors speculation, imagination, or suggestions of changes in its beliefs. In our cultural pattern today, speculation is considered...perhaps 'mentally unstable' is the term best approximating the mild abhorrence." [9] Although these last words were written over 20 years ago, they are still valid to a great extent and may explain why SF is not yet accepted by certain circles.

SF has other unusual and new aspects. Some of its famous authors are at the same time important men of science, e.g., Asimov and Arthur C. Clarke, thus bridging the gap between literature and science. Furthermore, most of today's SF writers are former readers of SF or "fans," as these SF fanatics or devotees are called. Special letter columns in SF magazines created a significant interaction between readers and authors, a development unknown in other forms of literature, as Lundwall describes in a chapter wholly devoted to "Fandom:"

> In a field which has been met with precious little understanding by outside critics, science fiction fandom has created its own standards of quality. Via the fruitful feedback system between readers, writers and editors it has succeeded in transforming an admittedly crude literature into a suitable tool both for entertainment and social criticism as well as a literature of no mean literary qualities. The editors of the magazines have always been predominant in influencing the development, but the readers always have known their preferences as well--and they have had the chance of making themselves heard. This is democracy to a degree that never has occurred in any other literary field... [10]

What are these standards of quality that SF fans use in order to distinguish good from bad SF? In his "credo" Damon Knight writes about SF "that ordinary critical standards can be meaningfully applied to it: e.g., originality, sincerity, style, construction, logic, coherence, sanity, garden-variety grammar." [11] What Knight means by "garden-variety grammar" becomes clear when we look at another comment of his in which he expresses Snow's "gap between the two cultures" (science and humanities) in his own way:

> Language and engineering are demanding and, perhaps, essentially contradictory disciplines; again and again in science fiction we meet the engineer who knows his subject, has story-telling gifts, is ambitious and productive; can build and service a hi-fi rig--and has a seventh-grader's understanding of that equally complex instrument, the English language. [12]

Robert Heinlein also believes that "all the usual criteria of literature apply to science fiction...only more severely" because "<u>good</u> speculative fiction calls for both...extensive scientific training <u>and</u> intensive literary training." [13] /my underlining/ Lundwall is the odd one in this respect. He maintains: "Science fiction is a field with its own qualities

and possibilities, and it should be recognized not for its handling of standard literary tools but for its handling of tools and themes unique for the field." [14]

If Heinlein is convinced that good SF requires scientific and literary training, Darko Suvin goes even further with his notion that significant SF denies the gap between the two cultures more effectively than any other literary genre and that it requires not only scientific knowledge but also a certain imagination and wisdom in social affairs. [15] For Donald A. Wollheim mature SF is based on the combination of four elements in the same story: imaginary voyages, future predictions, remarkable inventions and social satire. [16] While Atheling defines that "good science fiction must not only contain some science but depend upon it," therefore bad SF "does not contain any trace of any science." [17] All of these opinions taken together distinguish more clearly good SF from bad.

The quality of SF has been questioned many times from outside as well as from within, so that a few statements may be allowed to justify SF to a certain degree. At the same time they will show how sensitive SF writers and critics are about this relatively new literary genre. To Sturgeon's notion that "ninety percent of all science fiction is crud," Lundwall adds: "...but, on the other hand, ninety percent of everything is crud!" [18] Sturgeon complains: "Never before in the history of literature has a field been judged so exclusively by its bad examples." [19] Heinlein consoles us: "...the primary reason that there is so little good science fiction is that there is so little science fiction of any sort." [20] Whereas Knight reminds us in his credo "that a bad book hurts science fiction more than ten bad notices" and later: "If science-fantasy [Knight uses this term and SF interchangeably] has to date failed to produce much great literature, don't blame the writers who have worked in the field; blame those who, out of snobbery, haven't." [21]

On the whole, SF is not worse off than any other literary field. In fact, it may have certain advantages that make it

possibly the most adequate literature for our time. Lundwall, as we have seen, praises it for its ability to cope with the factor of change and Suvin underlines its denial of the gap between science and humanities. Herbert Franke, a German scientist as well as SF writer, also stresses the importance of bridging this gap by starting with a re-orientation of schools and universities toward relevant questions instead of producing "technical analphabets:"

> Im Moment sind in unserem Gesellschaftssystem immer noch die "Humanisten" tonangebend. ...und so kommt es, dass man auch heute noch, in einer Welt, in der die Frage des Überlebens mit jener des technischen Wissens verknüpft ist, junge Menschen im Sinn der klassischen griechischen Ideale erzieht. So macht man sie jedoch zu technischen Analphabeten, die das Wirkungsgefüge ihrer Umgebung nicht mehr verstehen. [22]

For Franke this question of relevance is the significant advantage of SF over mainstream literature or any other literary field. [23] Yet, the preference for SF is in the end a subjective decision.

In this part only a few points of the complex phenomenon of SF could be touched upon. By definition SF treats human problems in connection with science. The three important elements of SF are: science (in its positive or negative effect), the sense of wonder and the factor of change with which it confronts society. A unique interaction and criticism between SF writers, fans and editors lead to an improvement of the genre although its importance and quality still remains disputed.

B. The History of Science Fiction

The early beginnings of SF and its transformation from a crude pulp literature into a literary genre to be taken seriously will now be shown in a short survey of the history of SF.

Thanks to some overzealous critics who disregard the most basic definitions of SF, the prehistory of this field has been traced back 2,000 years and more. Some fans go back to biblical times, to the book of Ezekiel with reference to objects from space, but Jean Gattégno remarks about such ardor: "C'est se moquer des gens. Une vision mystique, celle d'Ezéchiel, ne mérite d'être appelée ni scientifique, ni, à proprement parler, fictive." [1] Lundwall mentions Swedish scholars who even include Dante's Divina Commedia in SF with Beatrice as the first astronaut! [2] Sam Moskowitz insists that the form of SF can "with logic be traced back to the ancient 'travel tales'" such as Homer's Odyssey; he calls the old utopias (Plato's Critias and More's Utopia) "technically works of science fiction," Swift's Gulliver's Travels a "science fiction satire" and Bergerac "the greatest science fiction writer of his century!" [3] Certainly, Bergerac's seven suggestions for defying gravity in Le Voyage dans la Lune are quite fascinating, but--as Gattégno observes--"...c'est bien le souci de plausibilité...qui fait toute la différence entre Cyrano de Bergerac et Jules Verne..." [4]

Hence, plausibility is one important factor that differentiates SF from these classics in which some of the devices used are pure fantasy, others were certainly ingenious for their time, some are not possible from the present scientific point of view and a few may have influenced SF writers until

today. Asimov adds two other factors--the divergent intent and the technological development--that separate SF from what he calls "social fiction:"

> Social fiction is that branch of literature which moralizes about a current society through the device of dealing with a fictitious society. ... Science fiction, on the other hand, is really concerned with the fictitious society it pictures. ... Science fiction is that branch of literature which deals with a fictitious society, differing from our own chiefly in the nature or extent of its technological development. [5]

This additional definition of SF clearly indicates that SF cannot have existed before the advent of science which gave rise to the Industrial Revolution and its social changes, although this does not exclude science fictional elements in earlier works. [6]

It may be difficult to pinpoint the exact starting point of SF so that it is tempting to accept Brian Aldiss' conviction: "...science fiction was born in the heart and crucible of the English Romantic movement in exile in Switzerland, when the wife of the poet Percy Bysshe Shelley wrote Frankenstein: or, The Modern Prometheus." [7] In a chapter entitled "The Origins of the Species: Mary Shelley" Aldiss exposes the following chain of influences: the evolutionary theories of Erasmus Darwin (the real credit goes to him and not to his grandson Charles!) had an impact on Mary Shelley's novel (written in 1818) which in turn inspired today's SF:

> Frankenstein's is the modern theme, touching not only science but man's dual nature... The concept of Frankenstein rests on the quasi-evolutionary idea that God is remote or absent from creation... We can see that Erasmus Darwin thus stands as father figure over the first real science fiction novel. [my underlining] The Faustian theme is brought dramatically up to date, with science replacing

> supernatural machinery. Inside Mary Shelley's novel lie the seeds of all later diseased creation myths, including H. G. Wells' Island of Dr. Moreau, and the legion of robots from Capek's day forward.[8]

Mary Shelley's work cannot be read without acknowledging the influence of the English Gothic period, as the author admits: "Two other friends...and myself agreed to write each a story founded on some supernatural occurrence. ... I busied myself to think of a story... One which would speak to the mysterious fears of our nature, and awaken thrilling horror--one to make the reader dread to look round, to curdle the blood, and quicken the beatings of the heart."[9] Although Aldiss insists: "Science fiction was born from the Gothic mode, is hardly free of it now."[10] --we see again the divergent intent; Frankenstein was not written in order to deal with a fictitious society but rather to create horror. Therefore, following Asimov's definition, we cannot consider this book the "first real science fiction novel" although SF elements are no doubt present.

Another author of horror tales, Edgar Allan Poe (1809-1849), is often called "the father of science fiction." Amis calls Poe's "exaltation of idea or plot over characterisation" a "very direct influence on the development of science fiction."[11] Verne--who used various themes from Poe's stories--admitted that he had "learnt more from Poe than from any other writer."[12] And Moskowitz calls at least six stories by Poe "science fiction stories."[13] In contrast to this, David Ketterer thinks "no single work of Poe's qualifies as what is generally understood as 'straight' science fiction. ... What remains are science-fictional elements only."[14] Poe had undoubtedly some influence on SF--with certain ideas and especially with his short story technique--but with his love for horror mystery he may much more be considered the father of fantasy than of SF. As Lundwall states: "Poe laid the groundwork for the present-day fantasy..."[15] All depends on whether one includes fantasy in SF or not (a point that will be discussed later).

Not disputed as "fathers of science fiction" are the two

prolific writers Verne and Wells. Jules Verne (1828-1905) became famous for such scientific speculations as the submarine in his Vingt mille lieues sous les mers (1869) and the use of a rocket in space in Autour de la Lune (1870). As Moskowitz put it: "Verne metamorphosed overnight into one of the world's brightest literary stars simply by hitting upon the idea of stressing speculative scientific adventure in full-length novels which placed the strongest possible emphasis upon credibility." [16] In most of his works we find Verne's optimistic belief in the holy machine and in progress. Only in his later works--like L'éternel Adam (1905)--did he begin to show that the machine can be dangerous and that science can be misused.

Opinions about Verne vary widely. Wilhelm Bölsche considers him "one of the best humorists of his time" but criticizes his superficial scientific knowledge (in contrast to Lasswitz') that caused him to use some outdated facts and make mistakes here and there. [17] Jacques Sadoul thinks quite positively about this founder of SF:

> Durant mon adolescence, j'ai lu cet auteur avec passion et je ne le renie pas aujourd'hui. Certes, il y a du déchet dans son oeuvre immense et on ne peut que déplorer son nationalisme et son mépris des juifs. Jules Verne reste néanmoins pour moi un des grands écrivains français, tant du point de vue littéraire que de celui, plus particulier, de la science-fiction. [18]

Amis disparages Verne's literary talent: "In its literary aspect his work is, of course, of poor quality, a feature certainly reproduced with great fidelity by most of his successors." [19] And Wollheim obviously hates Verne: he calls him a "typical small-minded French bourgeois nationalist...with a fixation only on inventions and gadgets." [20]

In contrast to this, Wollheim appreciates H. G. Wells (1866-1946), "the Utopian, concerned with social aspirations and world organization and always utilizing science fiction in context with its influence on the changing of humanity." [21] He insists--by using his four major classifications of SF--

that Wells started where Verne left off:

> Verne's works stayed highly within the restrictions of Imaginary Voyages and Remarkable Inventions, and strayed into Future Predictions with great reluctance, and into Social Satire never. On the other hand, H. G. Wells started off in the realm of Future Prediction and Social Satire with his magnificent gem The Time Machine, still one of the most perfect little novels in the genre. [22]

To this Amis adds that Wells' literary merit is higher than that of Verne. [23]

Wells' negative view of mankind in The Time Machine (one human race uses the other as food) was not appreciated by his contemporaries, e.g., one critic called it "a morbid aberration of scientific curiosity" and "perverse quest after anything... sensational". [24] But Wells continued showing the dangers of this modern world, especially in The War in the Air (1907) where he pointed to horrors that became only too true during World War I. The War of the Worlds (1897) with its invasion of Martian monsters was a source of inspiration for later SF in at least one respect: it caused the whole wave of hostile extraterrestrial BEMs--bug-eyed monsters--that were trying to destroy mankind without any apparent reason.

Another book about a Martian invasion was published the same year in Germany: Auf zwei Planeten by Kurd Lasswitz (1848-1910). In contrast to Wells, Lasswitz believed in the beneficial use of science for mankind so that his Martians are not raging monsters but superior humanoid beings who try to propagate their higher culture and technology. The novel--immediately a great success--was translated into many European languages although, strangely enough, it was not translated into English until 1971. Franz Rottensteiner calls Lasswitz "a German pioneer of science fiction" [25] and writes about the book: "/Es/ ist unzweifelhaft der bedeutendste Weltraumroman, den die deutsche Zukunftsphantastik bislang hervorgebracht hat. ...um die Wende zum 20. Jahrhundert war Auf zwei Planeten möglicherweise die bekannteste europäische Weltraumutopie." [26] Yet, it seems to

have had only an indirect influence on SF (through Hugo Gernsback), as we will see later.

SF started out in Europe but very soon became a predominantly American phenomenon. David Ketterer gives three reasons for this development: the lack of a usable past, an obsession with dreams of utopia and the search for a new frontier.[27] A more concrete reason, probably, was Hugo Gernsback's influence as editor of the first seven SF magazines.[28] Born in Luxemburg in 1884, he emigrated to the United States and became the person who finally coined the term "science fiction" in 1929.[29] Some SF fans--including Moskowitz--consider him the "Father of Science Fiction,"[30] while Aldiss remarks that "Gernsback was just a midwife disguised as a Young Pretender."[31] Unfortunately, Gernsback emphasized scientific fact and accuracy over literary quality and human interest, but on the other hand his editorial initiative was vital to the propagation of SF. It was in honor of his name that the literary prizes given since 1953 at the SF world conventions are called "Hugos."

The "Pulp Era" of SF started when the first pure SF magazines appeared under Gernsback in 1926. They were called "pulps" because of their low-quality paper (in contrast to the "slicks" which were printed later on paper with a glossy finish). During this era different kinds of SF started developing. One was Gernsback's science fiction that Asimov calls "gadget science fiction."[32] Apparently as a reaction to the overemphasis on science, another branch evolved that was neither based on reality nor on plausibility and that some call "science-fantasy." Unknown and Weird Tales, two fantasy magazines, were not without importance at that time--as Lin Carter points out--since they sometimes attracted SF writers "on a brief vacation from the rigors of cerebral, mature fiction-writing, having pure fun in a magazine [Unknown] whose horizons were so broad as to be out of view."[33]

As we mentioned earlier, the borderline between fantasy and SF is a point of controversy among SF writers and critics.

For example, Damon Knight disagrees with Heinlein on this point:

> Heinlein is one of those who draw a firm line between science fiction and fantasy. .../he/ is claiming something for science which he has no right to claim. We don't know that time travel and humanoid robots are impossible; neither do we know that fairies, Carroll's looking-glass world, a literal fundamentalist heaven and hell, or Joseph Smith's golden tablets do not and cannot exist. [34]

Carter, an expert on fantasy and heroic fantasy (also called "sword and sorcery"), justifies his field: "The stuff is fun to read, and fun to write." [35] At the same time he complains about SF: "These days, science fiction takes itself awfully seriously and strives to pretend it is a Serious Literary Genre, hoping nobody will remember that its roots lie in a bunch of gaudy, horrendously vulgar thirty-year-old pulps." [36] On the other hand, Atheling stresses the incompatibility of the two fields and refuses the term "science-fantasy:"

> ...I do not require any (let alone every) science-fiction writer to be a theoretical physicist. But... I think he ought to have some minimum knowledge of the rules of the game... If the writer...insists that he wishes only to entertain and that art is the farthest thing from his mind, that is his privilege--but can't we call the result "fantasy" and be done with it...? To hitch the word "science" to work of this kind cannot but be downright offensive to the scientific imagination... "Science-fantasy" may not yet have become a swearword, but it is certainly a contradiction in terms. ... Today it is being used as an excuse for getting the facts wrong... [37]

The controversy among SF fans may never be solved because of the difficulty of establishing a distinct borderline between the two genres. Fantasy can be a delightful entertainment, while SF, especially in the form of social criticism, aims at more than that: with its emphasis on plausibility and scientific fact it tries to have a certain effect on society itself.

In Atheling's words: "If science fiction is to have any value as social criticism, or as moral paradigm, or as real examination and prediction of human behavior, or any of the other special virtues it has claimed for itself, it has damn well got to be believable above almost any other possible form of expression." [38]

Closely related to fantasy is another field that started developing during the pulp era: "space opera." Here, an emphasis is put on adventures, scientific miracles and super-heroes. As Lundwall admits:

> The galactic patrols roamed the void, spreading Pax Terra at blaster-point, and scientific miracles were as common as apple pie. Nothing, absolutely nothing, is impossible in Space Opera. ... This is truly the modern fairy tale, gigantic in scope... Science had to bend knees for the Sense-of-Wonder, and the literary quality was a secondary matter. ... It might be a lot of rubbish, but I can't resist liking it. [39]

Amis, on the contrary, appreciates this field as little as fantasy [40] and is probably right in assuming that "space opera with a full complement of BEMs and a small staff of mad scientists attended by scantily clad daughters constitutes...the main brand image of science fiction in the minds of the less aucourant trend-hounds..." [41] In fact, Amis includes neither fantasy nor space opera in SF, speaking of both as "two adjacent fields." [42] Even today there still exist some magazines that specialize in these adventure stories "which originally sprang directly from the pulp Wild West yarns." [43]

Less disputed is another kind of SF (although its creator is a controversial figure). Asimov remarks:

> In 1938, John W. Campbell became editor of Astounding Stories. ...Campbell is the father of "social science fiction"; that is, the branch of science fiction which really lives up to my original definition: (Social) science fiction is that branch of literature which is concerned with the impact of scientific

advance upon human beings.[44]

Whatever Campbell's shortcomings may be (Wollheim calls him a "living fossil"[45] and Atheling criticizes him for propagandizing ESP instead of concentrating on fiction[46]), there may be no doubt that during the forties he had the greatest influence on the development of SF. It is this decade that is mostly referred to as the "golden years" or the "classic era" of SF, when Campbell discovered and encouraged young writers like Asimov, Heinlein, van Vogt, Sturgeon, Bradbury, Pohl and Brown, when Astounding Stories printed 75% of the important texts and the number of magazines increased from 3 to 20.[47] In fact, Aldiss remarks praisingly: "Astounding in its best years was a collaborative work, the first think-tank."[48] It was Campbell who insisted on scientific fact (like Gernsback), but as background to social and human problems, and who required a better style in writing.

During the pulp era three events certainly had an influence on the popularization of SF: 1) Orson Welles' famous radio broadcast in 1938 of H. G. Wells' The War of the Worlds (many Americans who had tuned in late thought the Martians were actually invading Earth and some listeners are said to have tried to commit suicide)[49], 2) the first World convention of SF fandom in 1939 (some of the most famous fans then present were Ackerman, Warner, Wollheim, Moskowitz and Bradbury)[50] and 3) Cleve Cartmill's Deadline (1944) on the atomic bomb published a few months before the first bomb actually exploded (this event caused a thorough FBI investigation of a supposed security leak, and when these agents tried to get the promise from Campbell not to publish anything anymore on nuclear fission he told them "to go to hell").[51]

Thus, after the second World War science fiction emerged as a literary genre to be reckoned with and to be taken seriously. The pulp era ended around 1950 when the pulps began to be replaced by the magazines in digest form (i.e. smaller size and better quality paper). Two of these new magazines, Galaxy and Fantasy and Science Fiction (that are still in the front

ranks today), show their editors' interest in high literary quality as well as social criticism. Naturally, the explosion of the Bomb over Japan was connected with this critique of society and technology, although--as we know--even before this event there existed some social criticism in SF: one has only to think of H. G. Wells and two major works of such literary merit that they are often not thought of as SF: Brave New World (1932) by Aldous Huxley and 1984 (1949) by George Orwell. But since the fifties, more and more SF writers have voiced their concern and painted a grey or black future. As Wollheim points out, by then they could concentrate on social aspects of SF because certain scientific facts and speculations could be considered general knowledge: "Science fiction builds upon science fiction. As a result of this, modern stories are freer to deal with sociological possibilities and the movement of humanity under future conditions and do not have to repeat pseudoscientific propositions endlessly." [52]

Hillegas devotes most of his article "Science Fiction as a Cultural Phenomenon: A Re-evaluation" to an analysis of how SF functions as social criticism. He names three genres of SF which have the best potential for criticism: dystopia, the post-catastrophe novel or story and space fiction--but each may contain some elements from the other two. Dystopia "extrapolates 'existing tendencies' in our world today to warn us what the future may be like;" post-catastrophe fiction "describes the collapse of civilization after a world disaster, usually a nuclear war;" whereas space fiction "set on another world... illustrates in its purest form the way a science-fiction genre can function as an instrument of criticism." [53] To space fiction belong the two novels mentioned earlier concerning extraterrestrial invasion: Lasswitz' Auf zwei Planeten and Wells' The War of the Worlds.

An interesting point to consider--although difficult to answer--is the effectiveness of SF as a medium of social criticism. Cyril Kornbluth, a typical Wellsian--i.e. pessimist--writes: "I believe that in science fiction the symbolism lies too deep for action to result, that the science fiction story

does not turn the reader outward to action but inward to contemplation." [54] In reply to Kornbluth, Basil Davenport suggests that SF "may have made more difference in social attitudes than can be traced... If the worst prophecies of science fiction have not been fulfilled, we may have science fiction partly to thank." [55]

A recent movement called the New Wave, Inner Space or New Thing originated from the British SF magazine New Worlds. It started around 1965 and is already fading out because its advocates have different aims and approaches. Atheling describes it as a new concern in stylistic possibilities "...with an accompanying borrowing of devices old in the mainstream but new to science fiction, such as stream of consciousness, dadaism, typographical tricks, on-stage sex, Yellow Book horror and naughty words..." combined with an escalation of social criticism: "Heavy emphasis upon the problems of the present, such as overpopulation, racism, pollution and the Vietnam war..." [56] Wollheim does not consider these authors as SF writers anymore, for they "have ceased to be universe makers,.../they/ have decided that the battle of the future is a lost cause." [57] Lundwall's judgment on this movement of dystopian, defeatist and destructive social criticism is even harsher:

> /It is/ nothing but the fear of change all over again--and this in a literary genre whose strength and fascination lies in its ability to face change and make the best of it. ...what we need are solutions or attempts at solutions, not literary drop-outs. ... Thus we have the "New Wave," refusing to do anything but scream for help because they can't cope with the world in which they are living. This literature is, of course, significant and even interesting as a sign of the sickness in our time, but I think we've had a little too much of it during the last years. [58]

Here the two extremes of SF meet; optimistic Vernians with their utopian fantasies or escapist dreams and pessimistic Wellsians with their "air-conditioned nightmares" or "new maps of hell" [59]:

both cannot face the present world, each only sees one side of the coin.

Science fiction, which had started out in Europe, turned mainly into an American phenomenon although Great Britain has never ceased to be important in SF after Wells. Wollheim describes this Anglo-American supremacy as follows:

> Scan the published science fiction in Germany, or Holland, or Italy, Spain, Japan, France, Sweden, Denmark and--lo!--you will find that from eighty to ninety percent of it is indeed from English originals! Translations galore into every language, but always of the same American and British masters we honor in their original editions. ... What a pat to the ego to discover that "our" science fiction does indeed dominate the Western world...[60]

In the United States some of the famous authors are: Isaac Asimov (who wrote over 100 books of SF and on science), James Blish, Robert A. Heinlein (very conservative in some points), Theodore Sturgeon, Kurt Vonnegut, Jr. and the two social critics who wrote many books together: Cyril M. Kornbluth (who died in 1958) and Frederic Pohl.

British writers become easily mingled with American ones. Besides Wells other major British authors are Arthur Conan Doyle (the "father" of Sherlock Holmes), Olaf Stapledon (a philosopher with vast cosmic visions), Huxley, Orwell and Arthur C. Clarke.

France produced only a few famous authors after Verne, like J. H. Rosny aîné whom Sadoul considers "le plus grand écrivain d'anticipation d'expression française, en dehors de Jules Verne,"[61] Maurice Leblanc--another author who wrote SF and detective stories (Arsène Lupin)--, René Barjavel and Gérard Klein. Although the present situation of French SF is far from excellent, Sadoul sees some hope for the future:

> ...parler de la science-fiction française contemporaine est d'autant plus malaisé qu'elle manque désespérément d'auteurs et n'a pratiquement pas produit de grands livres. ...[mais] j'ai tout lieu

> de croire que la longue traversée du désert de la S-F française est maintenant terminée. ... La science-fiction française commence demain.[62]

Except for Lasswitz, the SF scene in Germany looks even sadder. One important work of SF is Bernhard Kellermann's Der Tunnel (1913). Hans-Jürgen Krysmanski takes it as one example among eight typical "utopische Romane" because of a new type of man created in it, the engineer MacAllan, "der mit der Technik aufwächst, aber nicht mehr ihr Opfer bleibt, sondern sich als ihr Teil zugleich über sie erhebt."[63] After World War I the nationalistic Hans Dominik dominated the German SF market and is still a success in Germany. Krysmanski calls him the "Karl May der utopischen Unterhaltungslektüre" and his books "gedruckte Tagträumerei."[64] Rottensteiner adds: "Nach dem Zweiten Weltkrieg aber ist fast alle deutsche 'utopische' Literatur nur ein schwacher Absud angloamerikanischer Massenproduktion."[65] Lundwall's remark completes the picture on the contemporary scene of German SF:

> ...Western Germany has been rather active, sf-wise, particularly through the publishing of German editions of U. S. magazines. ... Germany has a lively sf fandom...but to this date this fandom apparently has been unable to produce any science fiction writer of quality. The local Big Names, Walter Ernsting and K. H. Scheer, devoted their efforts wholeheartedly to the type of Space Opera yarns that were popular in other countries twenty or thirty years ago, and it seems likely that both book series and the few short stories produced will stay at the monster-and-blaster level. Germany's Herr Science Fiction Walter Ernsting, who more or less dictates German science fiction, is now responsible for a kind of weekly Space Opera magazine featuring the übermensch Perry Rhodan. These magazines...have reportedly sold more than 60,000,000 copies (!) and have now appeared in the U.S.A. as well.[66]

It is indeed unfortunate that Lasswitz had so little influence,

even in his own country.

On the whole, then, Anglo-American supremacy in SF is still a fact. However, with the economic difficulties of American SF magazines and with the emergence of significant SF writers in Eastern European countries [67] this situation may soon change.

As we have seen, SF has come a long way--from writers such as Wells and Lasswitz via crude pulp stories to a certain number of respected works of art today, although mainly on the Anglo-American scene. It has undergone quite a few changes and influences since the beginning of its history, but the amazing fact remains that all of these influences still exist today in different groups of SF writers and fans. We still have optimistic Vernians, pessimistic Wellsians and horror-lovers à la Poe, there still are those who insist only on science as Gernsback did, there are the space opera fans, the social critics and finally the New Wave advocates--all of these form the complex phenomenon of SF. As is true for any literary field, ninety percent of it is crud, but it is the ten percent of good works that may one day turn SF into a more significant and respected genre. In this quest for quality, literary criticism--from outside or inside--always played an important role, as was evident with figures like Gernsback and Campbell as editors, Knight and Atheling as severe commentators and Amis as mainstream critic. Let us hope that this quest will continue.

To consider the Earth the only populated world in infinite space is as absurd as to assert that in an entire field sown with millet only one grain will grow.

Metrodoros, an Epicurean [1]

II. KURD LASSWITZ' NOVEL AUF ZWEI PLANETEN

A. Introduction

The idea that other planets may be inhabited by intelligent creatures existed long before SF did. The ancient Vedda culture of Ceylon believed in the migration of the dead souls "to the Sun, the Moon, and the stars before attaining the state of Nirvana;" the Greek philosopher Anaxagoras "maintained that invisible 'seeds of life,' from which all living things originated, were dispersed throughout the universe," a belief called "panspermia;" Epicurean and Roman philosophers propounded the concept of the "plurality of worlds;" under Christian cosmology (that was based on Ptolemy's theories of Earth as the center of the universe) people were burned at the stake for expressing ideas about beings on other worlds; Herschel believed the sun to be inhabited...and even today's flying saucer societies can be considered a "thinly disguised religion" of this concern with extraterrestrial life. [2]

A recent expression of this belief in extraterrestrials (ETs) is found in Erich von Däniken's books in which he suggests (although his theories are questioned) that certain phenomena on Earth (the "airfields" in the Andes, the sculptures on the Easter island, etc.) can only be explained through the former

presence of ETs on our planet. [3] What interests us here is only the idea in itself (not the question of scientific accuracy that goes beyond this study) and that in some points Däniken may be right.

Even a man of science like Arthur C. Clarke has played with this idea and used it in the film 2001 directed by Stanley Kubrick: ETs may indeed have been here in the past and left a "sentinel," a robot monitor, on the Moon in order to watch but not be detected. [4] In fact, Clarke refers to "a quiet revolution in scientific thinking about ETs" and to a similar belief to the one of the old Epicureans:

> ...the idea that we are the only intelligent creatures in a cosmos of a hundred million galaxies is so preposterous that there are very few astronomers today who would take it seriously. It is safest to assume, therefore, that They are out there and to consider the manner in which this fact may impinge upon human society. [5]

There is one question that will always occupy man's mind until the actual encounter: what forms of alien life can we expect? Clarke fully agrees with one remark made by J. B. S. Haldane (that "should be called Haldane's Law"): "The Universe is not only queerer than we imagine; it is queerer than we can imagine." [6] Therefore, Clarke's ideas about the alien forms of life may not sound too surprising:

> There is absolutely no way of guessing what shape extraterrestrial life forms may take... I have never been convinced that intelligence comes only in one model--and that that model has two legs, two eyes, and one mouth. Someday we may encounter representatives of far higher civilizations than ours, who may differ from us as greatly as we differ from the manta or the octopus. And as we have to overcome color prejudice, so our descendants may have to overcome a much more fundamental shape prejudice. The time may come when no well-bred person would dream of remarking that the ambassador from Rigel looks like a cross between a jellyfish and a tarantula (even if he does) or would

> be particularly upset because the members of the Sirian trade delegation have not only three heads but also four sexes. Fantasy? Of course; the reality of our Universe is fantastic. [7]

Man, however, is not only passively waiting for an alien encounter; since the touch-down of Apollo 11 on the Moon in 1969 he has been actively searching for extraterrestrial life (among other things). Wollheim believes that this reaching out to the cosmos is a natural instinct (as, for example, the sunflower's turning toward the sun); therefore he entitles one of his chapters "Cosmotropism" and explains: "I think that space flight is not a whim that happened to arise in the minds of dreamers.../but/ a condition of Nature that comes into effect when an intelligent species reaches the saturation point of its planetary habitat combined with a certain level of technological ability." [8] Wollheim compares man's situation on Earth to a Petri dish with growing and spreading spores; the "spores of humanity" will be self-contained starships with several generations: "We do have this compulsion to go out. ... For it will be our ticket to immortality. It will be the birth of cosmic humanity, of that Galactic Empire which seems to be surely part of the future once we become truly the masters of space flight." [9]

For thousands of years man has been dreaming about space flight but until this century nobody knew if this dream could ever become reality. Clarke reminds us:

> Before 1945, there were very, very few scientists prepared to admit that space travel would ever be possible; many wrote articles 'proving' that the whole idea was utterly ridiculous. The distances were too great, the power needed too enormous--and so on and so forth. Some of these articles make very amusing reading today. [10]

Therefore, we can admire even more a man who thought seriously about space flight before the end of the last century:

Kurd Lasswitz. Besides being a philosopher, writer and teacher, he was a scientist who was interested in contemporary theories which, at that time, often pertained to the planet Mars. Therefore, for an analysis of his novel Auf zwei Planeten it is helpful to know some details about the historical background of speculations on Mars.

In 1869 a French inventor, Charles Cros, wrote a book entitled Moyens de communications avec les planètes in which he insists that the luminous pin points seen occasionally on Venus and Mars indicate that the inhabitants of these planets try to communicate with Earth. Willy Ley describes the ideas and disappointments of this interplanetary "fan:"

> Cros proposed to answer by means of an enormous mirror...in order to "write" gigantic figures in the sands of the deserts of Mars... Cros wanted the French government to pay for such a mirror and he spent many years of his life making petitions... Nobody ever succeeded in convincing him that the existence of the Martians was, after all, not assured... that no optician could build a mirror of sufficient size and precision. Cros stubbornly clung to his idea. He died disappointed and in extreme poverty. [11]

Ley mentions another eager man, this time an English engineer, who calculated the enormous amount of powder needed to produce a flash that could be seen on Mars--it was circa a trainload which would be carried above the atmosphere by means of balloons (!) where the explosion could be better seen from Mars--; while other people "have amused themselves in working out a 'letter to the Martians'" in a "language" containing pictures, some basic mathematics and a diagram of the solar system. [12]

However, Ley indicates that the period of serious speculations about Mars started only in 1880 as a "logical result of scientific developments." [13] By this time Darwin's theory (published for the first time in 1859 in The Origin of Species) had come to be accepted more and more. This theory suggested "that all life was interrelated, not only in a symbolic manner of speaking, but actually. Wherever life started at all it was

likely that it, given enough time, would produce intelligent beings in the end. And it seemed probable that life would start wherever conditions were suitable..." [14] In addition, astronomers believed they had found an answer to the formation of a planetary system of a sun in the so-called Kant-Laplace hypothesis. Ley explains:

> [This hypothesis] stated that the planets had condensed out of matter that had been thrown off their suns. Obviously, then, the relative ages of the various planets could be read from their distances--those farthest away were the oldest. Mars, therefore, was older than earth by an unknown number of years, probably a large number. Consequently life had started that much earlier on Mars; consequently Martian humanity was older and wiser than we are. ...Mars was a replica of the earth as it was to be later; looking at Mars one looked, actually and almost literally, into the future. [15]

1877 was the year of two important events: Asaph Hall discovered the two small moons of Mars and the Italian astronomer Giovanni Schiaparelli claimed to have seen on Mars what he called "canali" (Italian for grooves or channels). [16] Based on Schiaparelli's findings, Percival Lowell observed Mars very closely during the opposition of the two planets in 1894/95 from an observatory at Flagstaff, Arizona that was "put up for the purpose of getting as good air as practicable." [17] He published all his data and drawings in his first book on the "red planet" entitled Mars (1895).

Lasswitz, himself an astronomer, was certainly familiar with the theories of Darwin, Laplace, Schiaparelli and even Lowell, though he might not have actually read Lowell's book (Mars was printed in November 1895 and Lasswitz wrote his novel between November 1895 and April 1897). [18] As Rottensteiner indicates concerning Auf zwei Planeten: "...in der Tat lesen sich viele Stellen wie ein Auszug aus dem Marsbuch des amerikanischen Astronomen Lowell, der damals sehr bekannt war." [19]

The following observations and deductions by Lowell are

all somehow incorporated into Lasswitz' novel. Lowell noticed that the Mars year corresponds to 687 Earth days (because Mars is 50% further away from the Sun) and a Martian day is 40 minutes longer than an Earth day. (L 12, 22) [20] The tilt of the Mars axis to the plane of its orbit is nearly the same as the one of Earth, therefore Mars has similar seasons to our own in spite of their being about twice as long. (L 23) The surface of Mars is a little more than 1/4 of the Earth's, his volume about 1/7 and his gravity 38/100 of hers. (L 16, 19) Lowell estimated the atmospheric density at the surface of Mars at 14/100 of that of Earth (L 52) -- although today we know it to be only about 1/100. [21] He mentioned three general regions: 1) "blue-green areas" that have been considered to be seas and that he thought to be vegetation (L 107-120) -- today these areas appear an almost neutral grey that could still represent vegetation [22] ; 2) "reddish-ochre areas" (therefore the name "red planet") taken for deserts (L 107) and 3) thin polar ice caps that wax and wane with the seasons (L 76-92). Lowell believed that the oceans of Mars had dried up long ago and that the single open body of water is an ephemeral polar sea that exists only during the melting of an ice cap (L 122, 92) -- while today experts think that the ice turns directly into water vapor because of the low atmospheric pressure. [23]

Schiaparelli's famous "canali" were observed by Lowell as a "network of fine, straight, dark lines" of "supernaturally regular appearance" in both bright and dark areas. (L 131, 149, 171) They are defined as: "the better they are seen the more symmetrical they look," "temporary in appearance" depending upon the seasons and "permanent in place." (L 96, 157) Lowell deduces that they can only be artificial and are really canals built by intelligent inhabitants whose "chief material concern of their lives" is irrigation due to the scarcity of water on this planet. (L 127-128) The lines seen at such a distance would have to be about 30 miles wide; therefore, what is actually seen, is the stretch of vegetation around the canal that becomes visible with the melting of the ice caps. (L 132, 162) At the intersections of the canals are round spots that also darken

with the seasons. Lowell deducts that these are oases and that "the canals are constructed for the express purpose of fertilizing the oases." (L 186) He concludes his book with the following statement:

> The evidence of handicraft, if such it be, points to a highly intelligent mind behind it. Irrigation, unscientifically conducted, would not give us such truly wonderful mathematical fitness in the several parts to the whole as we there behold. ... Party politics, at all events, have had no part in them; for the system is planet wide. ... If astronomy teaches anything, it teaches that man is but a detail in the evolution of the universe... He learns that, though he will probably never find his double anywhere, he is destined to discover any number of cousins scattered through space. (L 208-209, 212)

The designated observations and deductions by Lowell constitute part of the basis on which Lasswitz built his novel. Most of the general data on Mars (atmosphere, water supplies, days, years, surface, deserts, canals for the water from the poles etc.) are given in Lasswitz' chapter "Die Herren des Weltraums." (I, 102-104) [24] Lowell's idea that party politics had no part in the construction of the canals since "the system is planet wide" may have been used by Lasswitz in his concept of the federation of all 154 Martian states, and Lowell's intelligent inhabitants became Lasswitz' "Nume," "cousins" to man although superior to him mentally, ethically and technologically.

Today, two famous scientists--the Soviet Iosef Shklovskii and the American Carl Sagan in their unprecedented international cooperation in their book Intelligent Life in the Universe (1966)--ask the intriguing question: "But were the canals really on Mars, or, as with other beauty, in the eye of the beholder?" [25] The debate between Lowell and other astronomers stretched over decades and "led to a general exodus from planetary to stellar astronomy" because not even photographs could

detect the straight canals; thus, the answer is that the famous canals were rather in the eye of the beholder, since "the eye has a compulsive need for order." [26] Lowell's canals do not exist (a fact which does not exclude some kind of winding channels, or old river beds possibly caused by erosion), yet, his and Laplace's theories of a higher Martian mind are not quite dead: Shklovskii and Sagan mention the possibility that the two Martian moons Phobos and Deimos may be artificial satellites but that "they are much more likely mute testaments to a Martian civilization than signs of a thriving contemporary society." [27]

Many of our questions may soon be answered. Already in 1965 the American fly-by vehicle Mariner IV replaced the "'widely held' view of a lush, vegetated and canal-crossed Mars" with a "lifeless, cratered Moon-like world." [28] The year 1976 will be remembered in the research history of Mars because of the successful landing of the American Viking I and II. The two landers reached the planet in July and September after voyages of about 11 months each. The laboratories on Mars have sent back data which show that all the basic elements needed for life--energy, water, oxygen, nitrogen, carbon dioxide, phosphorus and even argon--are present, but until now (November) the scientists have not been able to solve certain contradictory results, so that the question is still open whether there is or was any form of life on the red planet. However, even if the answer is negative, Lasswitz' novel may still capture the imagination of many readers and create a certain sense of wonder.

Let us now take a closer look at the life and work of Carl Theodor Victor Kurd Lasswitz. Ley writes:

> Kurd Lasswitz was born in Breslau in Silesia on April 20, 1848, the son of a well-to-do merchant with some, for his time, highly unmerchantlike characteristics. He had a small observatory on the roof of his suburban home and later had himself elected to the Prussian parliament (Landtag) as representative of the Democratic

> Party of his district. The son studied philosophy, natural history, mathematics, and--naturally--astronomy. In 1876 he became professor of mathematics in Gotha, where he spent most of his life. [29]

More exactly, Lasswitz was teaching mathematics and physics at the Gymnasium Ernestinum in Gotha (apparently he had hoped for a professorship but never received it [30]). He was liked by his students for his wit and humor as well as for his teaching talents, although his wife once admitted to a friend that Lasswitz "mehr und mehr doch die Schule als eine Art Frohn empfand, die ihm seine beste Kraft raubte." [31]

His humor comes through especially in some of his short stories or essays, as for example in his "Selbstbiographische Studien" (1887) in Seifenblasen where one naturally expects to find something about his life--instead one is lead into a whole series of thoughts: the statistical method cannot be applied to his (Lasswitz') life because nobody knows the average daily literary working hours of a writer and he himself forgot to count his "poetische Zeit;" the historical method requires the study of the origin of all organisms and therefore of life itself, which leads to the metaphysical method with long deductive sentences culminating in the idea: if the reader understands all the thoughts about mankind representing nothing but a hole in the worldcheese ("Käse = Chaos") and "die begriffliche Analyse des reinen Ich als absolute Lochheit" etc., then the writer may seriously consider writing an autobiography based on the last method. [32] It is a nice parody on evolutionary and metaphysical theories of his time, but unfortunately it does not give us much insight into Lasswitz' private life.

Lasswitz was deeply influenced by Kant, Fechner, Goethe and Schiller, as can be seen throughout his theoretical and literary works [33] in which he mainly pursued three aims: the historical and critical study of the basic physical concepts, the popularisation of Kant and the creation of what he called "das wissenschaftliche Märchen" by basing his stories on contemporary scientific knowledge--thus trying to bridge the gap between the two cultures.

In the world of science and philosophy he is mostly known for three works: Geschichte der Atomistik vom Mittelalter bis Newton (1890), the biography of Gustav Theodor Fechner (1896) and Wirklichkeiten (1900).

Fechner (1801-87) founded a new branch of psychology called "psychophysics" which was based on his law that a physiological phenomenon corresponds to every psychological stimulus or phenomenon. [34] After a long and severe illness Fechner understood life in a much wider context: he saw psychical life in the entire universe in different degrees, be it in plants, man, the planets, the sun and, as the highest all-comprising system, in God. [35] As we will see, Lasswitz used certain ideas of Fechner's psychophysics and panpsychism in some of his essays, short stories and novels.

Kant's influence is evident in the essays Wirklichkeiten in which--among other things--Lasswitz emphasizes that science, morality and art can coexist without contradiction as realities within one person [36], although they should be strictly separated in their methods, an idea that leads to Lasswitz' confession why he needed a little corner for his literary fantasies:

> Am wichtigsten scheint mir,...im gegenwärtigen Streit der Anschauungen...fest den Standpunkt zu vertreten, dass Erkennen, ethisches Wollen und Phantasie, oder sagen wir Wissenschaft, Sittlichkeit und Kunst, ebenso wie der Glaube, streng auseinander zu halten sind und sauber zu sondern; ihre Vereinigung erhalten sie erst in der Persönlichkeit und haben sie nur in der Persönlichkeit. Das ist der Weg, den Kant theoretisch vorgezeichnet und den Goethe vorgelebt hat; in dieser strengen Trennung und richtigen Vereinigung sehe ich das einzige Heil des Fortschrittes. Will man aber Wissenschaft wie Kunst behandeln, und Kunst wie Wissenschaft, Verstand mit Gefühl verquicken, so entsteht nur Mischmach... So sei Wissenschaft und Kunst streng in ihren Methoden getrennt, aber die Persönlichkeit kenne beide und erlebe sie beide... Das ist mein Leitfaden. Deswegen kann ich 'wissenschaftliche'

> Märchen schreiben, d.h. nur wissenschaftliche Stoffe in poetischer Form behandeln, aber nicht, um Erkenntnis zu erzeugen, sondern um Kunstwerke, so gut man's eben kann, zu schaffen. Man muss immer genau wissen, wo man phantasiert; und wo man forscht, darf man nicht phantasieren. Diese strenge Trennung hoffe ich nie vergessen zu haben. Meine belletristische Tätigkeit erklärt sich, wie ich glaube, eben daraus, dass ich zu viel Respekt vor der Wissenschaft habe, um von meiner Neigung zum Fabulieren etwas hineinzumischen, und dass ich mir darum für meine Phantasie dieses Eckchen vom Märchengarten angebaut habe... [37]

Although Lasswitz insists that he did not write "wissenschaftliche Märchen" "um Erkenntnis zu erzeugen," there can be no doubt that he did not only write them in order to create works of art or to use his imagination, but also to convey a certain ethical message that rendered his works somewhat didactic.

Among his literary writings probably the best known are: Seifenblasen (1890), Auf zwei Planeten (1897), Nie und Immer (1902), Aspira: Der Roman einer Wolke (1905) and Sternentau: Die Pflanze vom Neptunsmond (1909)--the last two showing Fechner's influence.

Even before Seifenblasen, in 1871 at the age of 23, Lasswitz tried his literary talent in a story entitled "Bis zum Nullpunkt des Seins: Erzählung aus dem Jahre 2371." It was reprinted in 1878 together with a later story "Gegen das Weltgesetz: Erzählung aus dem Jahre 3877" in his first book entitled Bilder aus der Zukunft. This book appeared only in a very small edition, probably because the author himself realized its poor literary quality. Rottensteiner points out: "Obwohl literarisch ohne jeden Wert, sind diese Prosastücke dennoch hochinteressant, denn sie enthalten bereits die Keime von vielen späteren SF-Geschichten. Wären sie nur besser bekannt gewesen, hätten sie manche SF inspirieren können." [38]

Many of these early elements and ideas can be found again in Lasswitz' major literary work Auf zwei Planeten. The first

story refers to the following technical inventions: flying cars and flying bicycles ("Luft-Droschken, Luftvelocipede," B I, 9, 11 [39]), houses up to 25 floors in order to leave room for agriculture (B I, 9)--on Mars the houses were that high because of the lesser gravity (II, 15), pills to give instant energy and replace a whole meal ("Universal-Kraft-Extrapillen," B I, 28, also B II, 207), a substance to cheer up--similar to Huxley's "Soma" ("Juckplätzchen," B I, 61 called "Cerebratin" in B II, 113) and an apparatus that allowed objects to become free of gravity (B I, 72).

Since the second story takes place 1506 years later than the first one, Lasswitz could use even more technological speculations. As in Auf zwei Planeten the question of food is quite important: the first story mentions only pushbuttons for ordering meals in a restaurant (B I, 28), whereas the second story is based on the invention of artificial protein so that in spite of overpopulation no scarcity of food existed because artificial bread, and even meat, could be made directly from water, air and rock at extremely low cost (B I, 111, 133). Everybody could afford again to eat at home, where a kind of minigrill on the table turned the simple raw materials into delicious food. (II, 146-147) This material progress favored a close family life, although it also had one disadvantage felt by certain sensitive people clinging to the past: since food was now made in factories, plants were no longer needed and apparently had nearly disappeared from Earth. (B II, 128)

Another great invention had been the direct influence on the functions of the brain through galvanic currents. The new field of psychophysics (here we find ideas of Fechner carried much further) had amazing pedagogical results in the brain-school ("Hirnschule"): after an early training of the child's brain--that is as necessary as the training of muscles but can partly be done during sleep--the child could already have the knowledge of an adult at the age of 9; in this way the problem of coping with the tremendous increase of knowledge was solved: "Der Geist eines Neunjährigen entspricht heutzutage an Reife und Erfahrung dem eines bejahrten Mannes aus einer

früheren Periode. ... Wenn sich der Lehrstoff dem Gehirn nicht bequemen will, gut, so bequeme sich das Gehirn dem Lehrstoffe!" (B II, 96-97)

Psychophysics lead to another invention, the brain-organ ("Gehirnorgel" or "Psychokinet"), that gave pleasant thoughts and feelings through direct stimulation of certain cerebral parts. (B II, 120-122) Rottensteiner refers to an important point in Lasswitz' thinking:

> ...auf die unheimlicheren Implikationen eines solchen Instruments, den Gedanken einer neuen, furchtbareren Sklaverei, ist Lasswitz nicht verfallen; dazu war er zu sehr ein Optimist des 19. Jahrhunderts, dem eine "Gedankenpolizei" gänzlich ferne lag. Ihn interessierten nur die das Dasein bereichernden Anwendungen, die Kunst, so wie er in Auf zwei Planeten eine Fühlkunst erfindet...[40]

Thus, the idea that constant stimulation of the brain may in the end change the human organs and lead to different types of human beings for thinking, feeling, working etc. and even to more than two sexes--a phenomenon that already exists among bees and ants--is certainly not meant in a negative way (like Huxley's alpha, beta, gamma men) but as an improvement of mankind. (B II, 157-162)

Probably in order not to repeat himself, Lasswitz did not use most of these fascinating ideas of psychophysics in the later novel. Also the following speculations in Bilder aus der Zukunft are not taken up again: complete weather control (B I, 22), underwater gardens and trains (B II, 114), special suits with a propeller fed by liquid oxygen so that a single person could fly through the air at speeds up to 150 miles per hour (B II, 131-132, 202) or sink down in water to a depth of 5400 meters (B II, 124), a substance called "Diaphot" that made persons invisible by giving them the same refraction as that of air (B II, 137), a computer: "...Die Aufgaben der grössten Meister hatten es dahin gebracht, dass ungeheure Rechnungen, welche sonst das Leben eines Einzelnen ausgefüllt hätten, durch die Integrationsmaschine in wenigen Stunden und

ohne jede Anstrengung des Denkens ausgeführt werden konnten" (B II, 139) [41], cloud-gardens ("Luft- und Wolkengärten") made up of transparent pipes filled with floating gas that formed changing clouds of beautiful colors--all this replacing former gardens and public squares (B II, 166, 139), attempts at communications with Martians via "Ätherströme" (B II, 148), suspended animation (B II, 219-225) and a tunnel connecting Europe with California (B II, 187). This tunnel was completely straight so that its center was 240 miles below the surface (an idea which recurs in Kellermann's Der Tunnel) and cars in a vacuum could use the descent to the center to gain so much speed that they climbed the other half through the gained energy (B II, 188-189).

It is then quite understandable why Rottensteiner speaks of the many SF "seeds" in these early stories which--in spite of their hardly being known--probably influenced Gernsback:

> Ich vermute jedoch, dass Lasswitz zumindest Hugo Gernsbacks Ralph 124C41+, einem gleichermassen wertlosen, aber ungemein einflussreichen frühen SF-Roman, als Vorbild gedient hat. Die Parallelen sind zu auffällig. Die meisten der prophetischen Erfindungen, die es bei Gernsback gibt, finden sich schon bei Lasswitz, mit Ausnahme des Radars: die Erdtunnels, die Flugmaschinen, der Tiefschlaf, die Erholungsstätten; und was es in Bilder aus der Zukunft nicht gibt, findet sich in Auf zwei Planeten. Sowohl bei Lasswitz als auch bei Gernsback bedienen sich die Schurken eines Mittels zur Unsichtbarmachung, wenngleich Gernsback ein anderes Prinzip einführt. Die Schlafschule der Schönen neuen Welt nimmt Lasswitz schon um fünfzig Jahre vorweg, und Gernsbacks Hypnobioskop um 30 Jahre. Bei Lasswitz wie Gernsback geht es um die Entführung eines schönen Mädchens (was an sich wenig besagt, da dies ein Klischee der Trivialliteratur ist). ... Es scheint mir jedenfalls sehr wahrscheinlich, dass sich Gernsback die meisten seiner "Ideen" ausborgte: bei Lasswitz und möglicherweise auch bei Robida. Als gebürtiger

Luxemburger sprach er ja deutsch.[42]

Later we will see that other scientific speculations attributed to Gernsback already occurred in Lasswitz' Auf zwei Planeten, so that Moskowitz' comment about Gernsback's Ralph 124C41+ (1912) as "probably the greatest single work of prophecy ever written"[43] becomes somehow upsetting. Furthermore, the term "prophecy"--used by many critics--is inaccurate, as one of the top SF writers observes. Heinlein who was praised by Willy Ley for "one of the neatest predictions ever to come out of science fiction"--his remote-control manipulators in Waldo--and by Campbell for "nine major prophecies" on atomic weapons in his story "Solution Unsatisfactory"[44], deflates his own image by admitting honestly:

> The fact is that most so-called "successful prophecies" are made by writers who follow the current scientific reports and indulge in rather obvious extrapolation of already known fact. ... Science fiction writers have "prophesied" (if you will excuse a deliberate misuse of the word) so many things and so many possible futures that some of them must come true, with sometimes rather startling accuracy.[45]

Scientific extrapolations (or speculations) are not the only elements already existing in Bilder aus der Zukunft; the basic philosophical ideas of the later novel are also present. Both stories refer to a deep conflict between reason and emotion ending in the death of three main characters. In "Bis zum Nullpunkt des Seins" there are two parties: "die Nüchternen" who believe, "dass nur durch die Bildung des Verstandes ein Fortschritt der Menschheit möglich sei..." and "die Innigen" who trust in the warm "Empfindungen einer ideal fühlenden Seele." (B I, 20, 22) In "Gegen das Weltgesetz," the main characters are separated into two groups : Lyrika--the brain-organist--and Cotyledo (meaning: seed-leaf)--the botanist--are the emotional types, whereas Atom--a chemist--and his sister Functionata--a mathematician working on the computer--belong to the rational category.

Possibly Lasswitz shows the absurdity of extreme intellec-

tualism by having a "rational" hero commit suicide in both stories; on the other hand, there are also passages concerning feeling that are obviously ironic, for example the flowery discourse of Magnet, the poet, concerning the player of the smell-piano or "ododion:"

> O grosse Aromasia,...des vierundzwanzigsten Jahrhunderts erhabenste Ododistin! Ihnen gehört der Schwingungszustand meiner Gehirnzellen, Ihnen bebt jede Nervenfaser meines Rückenmarks! Wie die Flur den durch die mit Wasserdämpfen gesättigte Morgenluft stark absorbierten Sonnenstrahlen entgegenseufzt, so zittern nach den Düften Ihres Ododions die zarten Häute meiner Nase! (B I, 17)

In a more serious vein this conflict between reason and emotion or will and desire becomes evident in the first story in a discussion between Oxygen and Magnet: the former believes that progress is only possible through the advance of science as well as the education of man's intellect and comprehension, thus leading to a peaceful and tolerant society; Magnet anwers that individual desires can only be overcome by an ideal that sweeps over the minds like a new religion and that was already felt by Kant and Schiller: "...dass der Einzelne nur im Ganzen zu existiren [sic] und zu wirken vermag..." (B I, 34), whereas Oxygen insists on the rationality of man: "Er begreift, dass nur die gehorsame Unterwerfung unter das Gesetz freizumachen vermag. Diese Einsicht macht uns gerecht, tolerant, neidlos, friedliebend..." (B I, 36) A last quote from the second story may show how deeply Lasswitz was convinced of German idealism and its positive influence on the whole of mankind, in this case on the world population around the year 2500:

> Man war stolz zu leben und Mensch und Menschen zu sein; Wolstand [sic] herrschte überall und die schlimmen Gegensätze im Volksleben am Ende des zweiten Jahrtausends waren ausgeglichen. Der von Deutschland im neunzehnten Jahrhundert ausgegangene Aufschwung der Schulbildung hatte hierzu das Meiste beigetragen; neue Lehrer im Ideal waren dem Volke

> entstanden und Kants und Schillers unsterbliche Anschauungen waren tief eingedrungen--nicht ohne Kämpfe, aber das Losungswort hatte gesiegt: Ideen und Opfer! Die Ehrfurcht vor dem Ideal hatte die Roheit gezähmt und den Egoismus gebändigt; das tiefere Verständniss [sic] für die Welt hatte die Geistesträgheit der Massen gehoben und die Pleonexie der Reichen beseitigt. Das Urteil der öffentlichen Meinung erhob sich zu einer Macht, welche die Geister regierte und als die Personification der Wahrheit und Gerechtigkeit angesehen werden konnte. Es war eine Zeit höchsten Glückes auf Erden um die Mitte des dritten Jahrtausends. (B II, 100-101)

These are certainly laudable ideas in their core but they do not seem quite realistic from today's point of view.

Bilder aus der Zukunft, then, already contains many scientific speculations and the essence of Lasswitz' philosophy, both very fascinating, but it also displays the weaknesses that exist in the later novel: the lack of characterization, long passages on technological inventions or philosophical ideas that are insufficiently incorporated in the plot as well as a strong optimistic belief in science and man combined with a certain missionary zeal and didactic intent that today's readers can hardly share.

Another story prior to Auf zwei Planeten based on Kantian principles is "Apoikis" (1882). It is included in Lasswitz' first collection of short stories Seifenblasen (1890). The title in Greek means a place of emigration and refers to the new colony founded by friends of Socrates on an island in the Atlantic. This society is called a "Gemeinschaft seliger Götter" in contrast to the "Barbarentum Europas" (S 60) [46] (in the novel we have a similar opposition between Mars and Earth). The inhabitants of Apoikis live a life devoted to the education of the individual, to inner harmony, freedom and moderation, since they are not forced to subdue nature through science and technology (the island provides them with plenty of food in a

favorable climate) and they do not have to nourish and educate huge masses of people:

> ...frei von jeder Nötigung, äusseren Gefahren entgegenzutreten, richteten wir alle Kraft auf die harmonische Ausgestaltung unseres inneren Lebens, Vertiefung des Denkens, Erziehung des Willens, massvollen Genuss heiterer Sinnlichkeit. ... Wir sind nicht Sklaven der Sitte, wie die Naturvölker, nicht Herren der äusseren Natur, wie die gesitteten Nationen Europas, wir sind nur Herren von uns selbst, Herren unseres Willens, Herren des Bewusstseins überhaupt, und darum sind wir frei. Uns stört keine Sorge um darbende Völker, noch um eigennützige Tyrannen, wir haben keine Gesetze, denn jeder trägt das Gesetz in sich selbst. (S 70, 72)

This is one of the points on which Edwin Kretzmann criticizes Lasswitz: "The idealism of Goethe and Schiller becomes in the hands of Lasswitz merely a medium of escape from civilization. In Apoikis...Lasswitz presents the Utopia of a university professor." [47] This short story definitely pictures a utopia, in the sense of Ketterer, since it represents "theoretical models" and "impossible dreams of an ideal state," thus pointing "to the true place of the genre: beside the fairy tale, as a branch of fantasy." [48] Lasswitz himself gave the subtitle "Moderne Märchen" to his book Seifenblasen, the modern part being the few SF elements in "Apoikis:" shoes called "Anthydors" with which one can walk on water (a chemical disintegration of water prevents one from sinking, S 65), a liquid "Diapetton" that grills food within half a minute (S 67) and free ether to protect their island from unwanted disturbance (it is the same weapon that the Martians call "Repulsit"): "Wenige Minuten genügen, um unsere Insel mit einem Strome freien Äthers zu umziehen. Kein Körper kann diesen Strom durchdringen, in Atome aufgelöst wird er fortgewirbelt werden. Granate und Panzerschiff verschwinden in ihm wie der Strohhalm in der Flamme." (S 75) Here we have the ivory tower mentality par excellence, an intellectual elite which does not want to be

disturbed by the uneducated masses: "Wir verschweigen die Existenz unseres Staates, denn wir würden nicht verstanden werden und wollen nicht gestört sein." (S 74) This story represents an extreme position that Lasswitz tempered in Auf zwei Planeten in which a mass society is based on science and technology.

Lasswitz' essay "Ueber Zukunftsträume" (1899)--first published in the weekly Die Nation and then included in Wirklichkeiten--somewhat summarizes the main ideas on knowledge (or science), morality (or ethics) and art that are the foundation of his novel. Lasswitz believes that only reason and comprehension through education can subdue nature and passion; it is man's task "...Vernunft zur Herrschaft zu bringen in der Welt, und Natur zu verwandeln in Kultur, in Gerechtigkeit, in Schönheit und in Liebe. ... Lernen müssen alle, was gegen Begierden wappnet und gegen die Macht der Elemente schützt." (Z 468) [49] Technological progress provides more material wealth and more time for mental and cultural work:

> Es handelt sich aber nicht nur um Erhöhung des Komforts, es handelt sich um eine wirkliche Verallgemeinerung der Lebensgüter durch die gesteigerte Macht der Menschheit. ... Welch gewaltige geistige Kraft ist [durch die Anwendung der Dampfkraft] für die Kulturarbeit der Menschheit frei geworden... Aus dem menschenwürdigeren Dasein aber strömt eine Erhöhung des Lebensgefühls, die weit über das individuelle Behagen hinaus eine wirkliche Kulturförderung bedeutet. ... Die Ideale der Humanität haben kein mächtigeres Hilfsmittel als die Bezwingung der Natur. (Z 481)

After this praise of science, Lasswitz asks: "Ist es berechtigt, jene Zukunftsträume und insbesondere die Verbesserung menschlicher Zustände mit Hilfe des Fortschritts der Naturerkenntniss [sic] und der technischen Kultur zum Gegenstande der Dichtung zu machen?" (Z 481) While answering this question positively, he defends at the same time "das wissenschaftliche

Märchen" in--what Rottensteiner calls--"eine der historisch ersten Rechtfertigungen der Science Fiction" [50]:

> ...was gibt es denn menschlich Bedeutungsvolleres als die Zukunft der Menschheit? ... Es gilt, das neue Naturgefühl persönlich zu gestalten. .../es/ entsteht...dem Dichter die Aufgabe, die Neue objektive Macht wieder im subjektiven Gefühle sich anzueignen. ...darin eröffnet sich ein ungeheures Feld für das wissenschaftliche Märchen... (Z 482)

Since we will refer a few more times to this essay, these quotes may suffice.

Let us still mention one additional story and two essays of the posthumous volume Empfundenes und Erkanntes which show that Lasswitz never quite stopped dreaming or thinking about the planet Mars, until his death in 1910.

"Die entflohene Blume" (1910) with the subtitle "Eine Geschichte vom Mars" is based on Fechner's belief that plants have souls and feeling: "Die Martier wissen längst, dass die Pflanzen auch beseelte und fühlende Geschöpfe sind, und haben gelernt, ihre Bewegungen und Töne zu verstehen, durch die dort die Pflanzen zu sprechen vermögen." (EE 241) [51] It is a nice little "Märchen"--without any Kantian philosophy--of a boy and a girl who possess a plant that once lived freely in the mountains and whose blossoms escape from the house in order to live in the open air. The boy knows where they are flying to and chases them with his strange car, "das Kletter-Auto," that looks like a big insect--with its six long legs--and can climb vertical walls by means of a suction mechanism. (EE 243-244) In the flower gorge the two children are surprised by the "Tiefenwurm," a deadly fog, but the two blossoms save the children by covering their faces. The story ends--like many fairy-tales--with a little moral, when the boy exclaims: "'Ihr habt uns gerettet, und wir wollten euch fangen! Nein, nie wieder wollen wir einer Pflanze die Freiheit rauben!'" (EE 247)

The two essays are "Unser Recht auf Bewohner anderer Welten" (1910) and "Der tote und der lebendige Mars." They

will be mentioned later in the chapter concerning the Martians.

We have seen that the ideas of extraterrestrials and space flight existed long before SF did and that Lasswitz was a pioneer in that he gave a scientific basis and an ethical goal to these two ideas. It can be presumed that he was familiar with the evolutionary theories of Darwin and the current speculations about Mars by Laplace, Schiaparelli and Lowell. At the same time his thinking and writing was deeply influenced by Kant, Fechner, Goethe and Schiller. Many technological extrapolations and the basic philosophical ideas of Auf zwei Planeten can already be found in earlier literary works of his--Bilder aus der Zukunft and "Apoikis"--and some recur in later writings--"Ueber Zukunftsträume" and Empfundenes und Erkanntes--so that the scientific, literary and philosophical concern in what he called "das wissenschaftliche Märchen" remained upmost in his mind throughout his life.

Before we start analyzing Auf zwei Planeten in greater detail, let us give a short summary of the major events of this novel with its nearly thousand pages.

Three explorers--Hugo Torm, Josef Saltner and Grunthe--reach the North Pole in a balloon only to find out that they are not the first to arrive there: below them lies a circular artificial island with a large map of part of the Earth in polar projection. Their balloon is caught in some kind of whirlwind and suddenly carried up high into the atmosphere by an "abaric field," an area without gravity. Saltner and Grunthe are rescued by the Martians on the island while Torm escapes across the ice. On the island the two explorers learn that the Nume--as the Martians call themselves--became the masters of space after having overcome gravity. The Nume want to bring the blessings of their superior culture to the Bate[52] (humans) and ask little in return, namely the export of air and solar energy for their older and smaller planet.

Due to a misunderstanding, an English warship attacks the Martian airship and is defeated. This incident becomes a bad omen for the contact between the two planets. Against their will, the Nume finally have to use force to break the English pride by destroying the entire navy fleet within a few hours. When, during another event, Turks and Europeans start to massacre each other, the peace-loving Martians are so shocked that they decide humans are savages. They establish a protectorate over the entire Earth but enforce it only in Western Europe and especially in Germany where they try to educate the Bate up to their cultural level of "numedom." The humid Earth climate and the contact with the Bate eventually turn some Martian "Kultors" into despots. Meanwhile on Nu (Mars) an Antibaten party is formed that only wants to exploit the energies of Ba (Earth) and if necessary destroy the whole of mankind. The humans successfully revolt under the motto "numedom without Nume" by constructing their first airships and by threatening to destroy the outer stations above the two poles. The Philobaten party on Nu wins, and a peace treaty is finally signed between the two planets.

Since this novel was written by a philosopher, it may be more important to give a summary of the ideas than of the events. Lasswitz' major concern was an imagined (extraterrestrial) society that had overcome--through education of the intellect--the two obstacles to progress and therefore to human happiness: human passion and the power of nature. Science and technology, products of intelligence, allow the superior Nume to use more time for mental work and thus to develop their "numedom:" each individual learns that (Kantian) autonomy of the will is not based on egotistic desire but on the moral and rational obligation toward humanity. It is this inner freedom and bliss which the Martians want to share with the Bate. Ironically though, culture cannot be forced upon anybody; the humans can only find their autonomy without their teachers.

B. Analysis of the Novel

We will now look at different points of this long and complex novel: the scientific and technological speculations, the planet Mars, the Martians with their high ethics, the humans and the main characters.

Maybe the most amazing difference between Nu and Ba lies in the scientific and technological achievements of the Martians. For the various inventions, Lasswitz used scientific speculation and a fascinating power of imagination. Rottensteiner comments positively:

> Was die rein wissenschaftliche Seite angeht, ist der Roman ein Muster korrekter Extrapolation. Am beeindruckendsten von allen Lasswitzschen Vorwegnahmen ist selbstredend die Raumstation. ... Lasswitz war...der erste, der in Form einer Geschichte die Idee eines künstlichen Erdtrabanten als Zwischenstation zu den Planeten verwirklichte.[1]

Lasswitz called these space stations "Ring," "Station," "Aussenstation" or on Earth "Marsbahnhof der Erde." They had the form of a huge wheel and were kept in place--at a certain distance above the Earth's or Mars' rotational axis--by an intricate system of balance between gravity and an electromagnetic field coming from the polar station below. (I, 39-42) The largest of these outer stations was located above the South Pole of Nu, where more than 70 spaceships could be parked at a time. (II, 3) The abaric field between the upper and lower stations was used for flight vehicles with passengers and controlled by a gravitational generator. (I, 43-44) All energy needed (also for transportation on Nu) was collected and transformed solar radiation.

Let us compare this fiction to reality. Solar energy has only recently been used for generating power in artificial satellites while space stations as such do not yet exist. However, Clarke and Kubrick used the idea and form of Lasswitz' station in the film 2001, and concerning the station held in position by anti-gravitational forces Clarke regrets: "We will have to manage without such forces for our own satellite program, though many rocket engineers have probably thought wistfully of Lasswitz' imaginary (yet perhaps not impossible) gravity-defying 'Repulsors' from time to time." [2] The recent American laboratory in space (Skylab) is based on a similar concept as Lasswitz' outer stations except that Skylab was only used for research purposes. In Clarke's story "Vacation in Vacuum" (1953)--which the author calls "the original inspiration of the space-station sequence in the movie" 2001--he mentions the possible use of space stations as astronomical observatories, meteorological stations, military reconnaissance units, scientific laboratories, space hospitals (especially for heart cases or polio victims who can profit from less or no gravity), refueling stations for interplanetary travel and in the end as seeds for "spacious orbital cities." [3]

Lasswitz was mainly interested in space stations for interplanetary purposes. Clarke underlines the importance of such stations: "...even when we possess virtually unlimited power resources [like atomic energy], it seems likely that interplanetary flights will begin and terminate at satellite orbits, rather than on the actual surface of any world" because of the two different types of vessels needed: light ships for space and strongly built ships that have to fight gravity and atmospheric drag. [4] Lasswitz already envisaged these technical difficulties, for his Martians used spaceships as well as airships. They discovered a material, Stellit, that allowed the waves of gravity to flow through their spaceships instead of influencing them. This state of non-gravity was called "diabaric." The spaceships were spheres made of Stellit and could thus be controlled in space:

Indem man die Schwerelosigkeit verstärkte oder ver-

> minderte, konnte man nun, wenn einmal der Körper eine bestimmte Geschwindigkeit besass, durch passende Benutzung der Anziehung der Planeten und der Sonne die Bahn des Körpers im Weltraum regulieren--vorausgesetzt, dass man sich in einem solchen diabaren Körper befand, in einer Kugel aus Stellit. (I, 111)

The speed or direction of the spaceships could be altered by directional shots from a projectile that was filled with condensed ether called Repulsit. The normal travel between the two planets during opposition took about four weeks, but under special circumstances (the use of so much Repulsit became very expensive) the trip could be reduced to eight days so that the velocity of the ship would be about 100 kilometers per second. (I, 181-187) -- A look at today's science shows that most Mariner fly-by vehicles took between 127 to 158 days to reach Mars.[5] This time could be reduced to about 40 days, but at a much higher cost than necessary for unmanned satellites.[6] -- Later in the novel, Repulsit was used in the war with the British to destroy cannon shells in the air, to churn the sea "als hätte man einen Berg hineingestürzt" and a "Repulsitschuss knickte die eisernen Masten wie Strohhalme." (I, 413, 410) This is a similar concept to the one used in "Apoikis."

The airships (their longish form reminds of the navigable balloons existing at Lasswitz' time) could also be guided and speeded up by Repulsit shots. The fastest ship ever constructed was a private yacht--"La"--covering 600 kilometers in 25 minutes (II, 464), an equivalent of 1440 kilometers per hour. -- This is faster than today's Boeing 747. -- These airships could be made nearly diabaric and had to be built with a much more resistant material than Stellit. (I, 308-309) For the special situation of war on Earth, the Nume developed a "Nihilitpanzer" around all airships: "Es ist ein Spannungszustand des Aethers, der momentan jede Kraft vernichtet, jedes Geschehen aufhebt. Alles was in sein [sic] Bereich gerät, verzehrt sich..." (II,180) Thus, no shells could damage the airships and one of them approaching a British warship, as it happened, was able to disintegrate iron masts or whole sides of the destroyer. -- Even

today there exists no such weapon.

Another amazing invention by Lasswitz is the system of traffic and transportation on Mars that runs entirely on electricity transformed from solar radiation. (II, 13-15) There existed glideways (Gleitbahnen) for large cargo at high speed so that for example private houses--all of them rested on sleigh runners with ball bearings--could be moved anywhere on the planet by means of a reaction machine! (II, 152) The wheeltrains (Radbahnen) consisted of individual carriages for passengers and could cover 400 kilometers per hour, whereas for short-distance traffic the usual means of transportation was the wheel sleigh (Radschlitten), "ein leichter, teils auf Kufen, teils auf Rädern ruhender Wagen für ein oder zwei Personen, den ein unter dem Sitz befindlicher kleiner Motor bewegte." (II, 13-14) Most ingenious were the moving roadways (Stufenbahnen) within the inhabited areas. They were made up of twenty strips, each moving 3 meters per second faster than the preceding one so that the fastest one covered over 200 kilometers per hour. They could be used on foot or by wheel sleigh. "Diese Stufenbahn war das Ideal einer Strasse, in ihr war jene Phantasie des Märchendichters realisiert, dass statt des Reisenden die Wege selbst sich bewegten." (II, 14)

Only today are specialists beginning to realize this technological dream within cities, with moving bands on a smaller scale than Lasswitz' (up to now only for pedestrians and covered so that they are protected from rain and snow).[7] Concerning the idea of moveable houses it should be noted that already Cyrano de Bergerac had developed similar notions in his book Le Voyage dans la Lune (1650):

> ...the cities of Cyrano's moon had some houses on wheels which by a combination of bellows and sails were moved at will about earth's satellite to take advantage of climatic changes. The homes that were stationary rested on giant screws and in the winter were dropped into immense underground cellars, protected from the harsh weather above.[8]

By now there exist thousands of mobile homes, mainly in North America, and Clarke predicts a nomadic future: "Most homes will be completely self-contained and mobile, so that they can move to any spot on Earth within twenty-four hours." [9]

Besides the overcoming of gravity (another dream of scientists) and the use of solar energy, the most important invention of the Nume was their production of artificial food (an idea that already occurs in the story "Gegen das Weltgesetz"). Thus, technology became the means for improving their cultural standard:

> Steine in Brot! Eiweisstoffe und Kohlenhydrate aus Fels und Boden, aus Luft und Wasser ohne Vermittlung der Pflanzenzelle! -- Das war die Kunst und Wissenschaft gewesen, wodurch die Martier sich von dem niedrigen Kulturstandpunkte des Ackerbaues emanzipiert und sich zu unmittelbaren Söhnen der Sonne gemacht hatten. Die Pflanze diente dem ästhetischen Genuss und dem Schutze der Feuchtigkeit im Erdreich, aber man war nicht auf ihre Erträge angewiesen. Zahllose Kräfte wurden frei für geistige Arbeit und ethische Kultur, das stolze Bewusstsein der Numenheit hob die Martier über die Natur und machte sie zu Herren des Sonnensystems. (II, 21) [my underlining]

Hillegas explains that "the book was written when Germany had begun to outdistance other nations in chemistry." (E 381) [10] Clarke underlines the importance of artificial food production, thus supporting Lasswitz' idea of agriculture as a "niedriger Kulturstandpunkt:"

> By the twenty-first century, agriculture will be on the way out. It's a ridiculous process: a whole acre is needed to feed one person... Food production is the last major industry to yield to technology. ... One promising field of research is the production of proteins from petroleum by microbiological conversion. (Which sounds most unappetizing--but we do use microbes to make wine!) This process gives high-quality proteins, some of them better balanced for

> human consumption than natural vegetable protein. It would take only 3 per cent of today's petroleum output to provide the total protein needs of the entire human race. [11]

Parallel to Lasswitz' notion that the emphasis will change to "geistige Arbeit und ethische Kultur" is Clarke's belief (and through him Nigel Calder's) that "we must disinvent work" if we want to survive in an automated society:

> ...the main problem of the future...will be the construction of social systems based on the principle not of full employment but rather of full unemployment. ...we may expect a society which no longer regards work as meritorious, or leisure as one of the devil's more ingenious devices. ...much more time than at present will be devoted to sports, entertainment, the arts, and everything embraced by the vague term 'culture.' [12]

The Martians were able to use light beams for telegraphing and telephoning, but between Earth and Mars they only used light-dispatches; thus they could communicate very fast because of the tremendous speed of light. (I, 47) -- It should be taken into consideration that in the 1860's it was already known that light belonged to the family of electromagnetic radiation, and in 1888 Heinrich Hertz detected the radio waves that belong to the same family though the frequency--i.e., the number of waves of radiation produced in each second--is different. [13] As further explained in Asimov's Guide to Science: "In the decade following, it occurred to a number of people that the 'Hertzian waves' might be used to transmit messages from one place to another... By using powerful generators, Marconi was able to send signals over a distance of nine miles in 1896...and across the Atlantic in 1901." [14] Thus "wireless telegraphy" or the "radio" was born. Again, Lasswitz was certainly well informed about these discoveries and experiments. However, the application of electromagnetic radiation in space was realized only with the construction of the first satellites

sending back information to Earth.

An even faster method of communication with the past (!) was the "Retrospective." Since waves of gravity (following Lasswitz' theory) spread one million times faster than light, they can overtake light. Thus, a past event that happened "unter freiem Himmel und bei günstiger Beleuchtung" could be seen on a projector--after long, complicated calculations and adjustments of the instrument: "Der Erfolg beruht ja darauf, dass wir das Licht, welches damals von den Gegenständen ausgestrahlt wurde, auf seinem Laufe durch den Weltraum wieder einholen, sammeln und zurückbringen. ...aber die Bilder werden immer schwächer, je grösser die vergangene Zeit ist, weil das Licht inzwischen im Weltraum zu viel Störungen erfahren hat." (II, 47-48) Therefore, an event that had happened a year ago was reached in space--by the waves of gravity--in half a minute. This retrospective was in the process of being perfected by the Nume and was used for the first time in order to elucidate the misunderstanding between the English and the Martians. (II, 118-120, 126-133) -- Today, it is almost certain that gravity consists of waves (though it has not yet been proven), but the waves would travel at the same speed as light.

In addition to the major scientific and technological speculations mentioned above, there were many minor ones envisaged before their actual invention. Saltner and Grunthe were faced with most of these innovations at the very beginning of the novel. There existed: a loudspeaker system similar to our "intercom" with both "Fernsprecher" and "Fernhörklappen" through which one could communicate with other rooms (I, 66, 160); books that turned pages automatically when one pushed a handle (I, 64); rooms with an abaric apparatus with which one could change the gravity to accommodate either the Bate (full gravity) or the Nume (one third of Earth's gravity) (I, 82-83); automatic room lighting that turned on when one stepped on the floor in front of the bed (I, 117); fluorescent lamps, "die nur aus absolut luftleer gemachten, durchscheinenden Kugeln

bestanden und infolge der schnellen Wechselströme leuchteten" (I, 221); an automatic wardrobe that attracted, cleaned and sorted all clothing, "sobald der Schluss gelöst wurde, der die Gegenstände am Körper befestigte" (I, 61-62); electric combs: "sie wurden elektrisch geladen und streckten dann die Haare geradlinig vom Kopfe ab" (I, 131); a kind of instamatic camera called "Taschenschnellphotograph" that copied words on a strip of paper sensitive to light and "den man als Notizbuch bei sich zu führen pflegte" (I, 134-135); a duplicating machine that copied whole books (I, 136); machines dispensing food and drinks (I, 120-122) (s.a. Bilder aus der Zukunft); knobs to make tables, chairs, wash basins etc. appear or disappear (I, 120-123), and finally "piks" that were as calming to Martians as cigarettes to humans--without the unpleasant smoke (similar to the "Juckplätzchen" in "Bis zum Nullpunkt des Seins"):

> Brachte man die Kapsel...etwa in der Grösse und Gestalt einer kleinen Taschenuhr...an die Stirn, so ging ein schwacher, angenehm erregender Wechselstrom durch den Körper, wodurch man sich wohltuend erfrischt fühlte. ... Dabei zeigte sich auf der Kapsel ein zartes Farbenspiel je nach der Grösse des Widerstandes, den der Strom fand... Wegen der Grazie und Zierlichkeit der Bewegungen...hatte Saltner diesen Instrumenten den Namen Nervenfächer beigelegt. (I, 173)

Later on in the novel other inventions by the Martians are mentioned: "diabarische Glockenschirme" for the Nume, to protect them against Earth gravity (II, 234), refined later into diabaric hats for Martian ladies (II, 371-372); a mechanism in long-distance trains on Mars which awoke the traveller by shaking the pillow, "ein Rüttel-Wecker" (II, 164); a tape recorder called "Grammophon" (II, 153-155); energy pills: "Es ist kein anregendes Nervengift... Es führt dem Blute und damit dem Gehirn wirklich die verbrauchte Energie wieder zu, und zwar genau in der Form, wie es durch den Schlaf geschieht." (II, 51); a synthetic material called "Lis" that came from a spider, was transparent, could withstand great weight and was so thin that a whole blanket could fit into the palm of a hand (I, 164-165, II, 28, 30-31) --

a predecessor of today's "space blanket;" machines for the export of air in frozen form (II, 55); photoelectric cells to open doors (II, 23-24); a mechanism to lift the wheel sleigh onto higher wheels for bad roads (II, 46); "eine Entwaffnungs-maschine" with a strong magnetic field that disarmed entire armies within minutes (II, 283-284); and as a last example the "Telelyt," which in the form of a revolver could paralyze nerves (I, 391), or as a larger machine was able to dissolve steel (I, 411); -- this telelyt might be compared to laser beams that were only invented in 1958.

In the novel we find very few references to the psycho-physical theories that Lasswitz used extensively in his story "Gegen das Weltgesetz." A newspaper article and some remarks by German citizens remind us of earlier quotes on the brain-school and brain-organ:

> ...eine Person wurde wegen dauernder Versäumnis /der Fortbildungsschule für Erwachsene/ dem psychologischen Laboratorium auf sechs Tage überwiesen. Dem psychophysischen Laboratorium wurden auf je einen Tag überwiesen: Drei Personen wegen Bettelns, eine Person wegen Tierquälerei, fünf Personen wegen Klavierspielens auf ungedämpften Instrumenten. (II, 248)
>
> "Sie würden sich aber ausgezeichnet zu Durchleuchtungsversuchen des Gehirns eignen...." "Haben Sie nicht Übungen machen müssen über die Ermüdung beim Kopfrechnen?" "Ich sage Ihnen, da habe ich ein Instrument gesehen, mit dem kann man die Träume photographieren." (II, 255-256)

Thus, there seem to exist two kinds of "laboratories"--a psychological and a psychophysical one--that are not further distinguished or explained. Although Lasswitz was not thinking of sinister applications of these labs either, it is evident that the reasons given for "confinement" rather ridicule the Martians who--through the contact with humans--had become quite despotic. The English translation speaks only of a "psychological House of Correction" in context with the newspaper article, but does

not contain the remarks of the citizens. (E 257)

It may still be interesting to bring to the reader's attention two erroneous speculations (in addition to the canals and the human forms of life on Mars): Lasswitz mentions mountains with grass and a lake at the North Pole (I, 10, 16) as well as polar bears at the South Pole (I, 198). However, we know by now that only the Antarctic is made up of land and that polar bears live exclusively in the Arctic; but these are facts he could not verify at the time, since the North Pole was only reached in 1909 and the South Pole in 1911.

Earlier it was indicated that Gernsback most probably took many of his ideas from Lasswitz' Bilder aus der Zukunft and from Auf zwei Planeten. Among other inventions Moskowitz attributed to Gernsback the following "fantastic number of accurate predictions disguised as fiction that have come true...since the story [Ralph 124C41+] was serialized;" extrapolations that are also in Lasswitz' novel: fluorescent lighting, tape recorders, loudspeakers, vending machines dispensing hot and cold foods and liquids, solar energy for heat and power, synthetic materials and space travel (of which the last one is the most absurd).[15] This leaves Gernsback with much less ingenuity than Moskowitz would like us to believe. And since Gernsback's novel was well-known in the United States, this would give much more credit to Lasswitz due to his indirect impact on SF.

However, Lasswitz had a definite influence on astronautical thinking, as a few examples may show. In the epigraph to the English translation, Wernher von Braun writes: "I shall never forget how I devoured this novel with curiosity and excitement as a young man. ... From this book the reader can obtain an inkling of that richness of ideas at the twilight of the nineteenth century upon which the technological and scientific progress of the twentieth is based." (E 7) Even Moskowitz (who--as we saw--probably never read Lasswitz' novel, especially since it was translated into English only in 1971) concedes:

> It is hard to deprive Lasswitz of the credit for popularizing the space station in the German mind. His book remained a standard classic in Germany until the Nazis assumed power, and it is inconceivable that anyone in that country interested in space travel would not have been familiar with it.[16]

And Ley admits that, when he and others experimented during the early twenties with a rocket propulsed by compressed oxygen and nitrogen, he called it "Repulsor:" "I took the term straight from Lasswitz' novel, because we wanted to avoid the word 'rocket,' which then still meant a powder rocket to virtually everybody."[17]

Hillegas contrasts Lasswitz' positive attitude toward science and technology (that we can also find in most works of Verne) to the English pessimism of that time:

> Lasswitz...has none of the natural distrust and dislike of technology and industrialization which characterized so many English writers and intellectuals of the same period--and justifiably, considering how industrialization destroyed the beauty of the English countryside and drove the English villagers with their attractive native culture into ugly, rapidly expanding industrial cities, where they suffered grievously. Nor does he fear science, a response which came to be part of the reaction of many Englishmen...to the French Revolution. For Lasswitz, on the other hand, science and technology can liberate and free men, but this vision is closely connected with his being a thoroughgoing Kantian... (E 378)

Thus, Wells' negative attitude in The War of the Worlds (1897) --that represents the opposite side of Lasswitz' faith in technology--becomes understandable. Yet, it is also obvious that Auf zwei Planeten has more to offer than only Vernian optimism: science and technology form nothing but the background for a whole philosophy of higher cultural development.

Lasswitz was attacked unjustly on this point by an anonymous writer in an article entitled "Der technische Chiliasmus in der neueren Dichtung" (1898). This critic called Lasswitz'

novel "eine Übersteigerung der Phantasien Jules Vernes" and compares the technical "Chiliasmus" to the religious belief in the return of the Messiah and "das tausendjährige Reich des Friedens" as well as to a certain political fanaticism:

> ...wie der dogmatische Republikaner wähnt, dass alles Leid und Übel der Erde vor der blossen Ausrufung und Aufrichtung der Republik entfliehen werde, so ist der Jünger des technischen unendlichen Fortschritts davon durchdrungen, dass alles weitere Mühen um sittliche, um intellektuelle, um persönliche wie um nationale, um literarische wie um künstlerische Kultur fernerhin überflüssig erscheine, da dies alles in der reissenden und blendenden Fortentwicklung der Technik mit inbegriffen sei. [18]

This is not true for Lasswitz. He defended himself in "Ueber Zukunftsträume" insisting that the striving for any improvement is vital for man and that he never thought of a perfect state of affairs:

> ...dieses Ringen nach Verbesserung ist das Leben der Menschheit selbst; Unzufriedenheit und Hoffnung sind die Triebfedern, die es im Gange halten. ... Das aber muss...betont werden: Es kann sich immer nur um einen relativen Zustand des Fortschritts, niemals um eine ideale Vollkommenheit handeln. ... [Der] christliche...Chiliasmus...hat aber gar nichts mit der Vorstellung zu tun, die unsere modernen Zukunftsphantasien vertreten, nämlich mit der relativen Verbesserung der Zustände durch einen allmählichen Entwicklungsprozess. ... Eine völlige Aenderung der Menschennatur vorauszusetzen wäre Willkür; nur an eine Läuterung dürfen wir denken. (Z 466-467) [my underlining]

Lasswitz' Martians use technology not as an end in itself but as a means for intellectual and cultural improvement, although no doubt the philosophy behind this notion is idealistic. Hillegas also defends Lasswitz to a certain degree: "Yet granting his naivete as viewed from the vantage point of a sadder and wiser age, there still exists, in my opinion, an ultimately

valid core to his vision. ... To survive man has need to master both himself and nature, and this requires knowledge, intelligence, and a superior ethic." (E 383) It was through their science and technology that the Nume mastered nature, while their ethics allowed them to master themselves.

Before we discuss the major differences between Earth and Mars as well as one similarity (religion), let us mention two small peculiarities on Mars that show again Lasswitz' flourishing imagination and probably the influence of Fechner's panpsychism.

There existed a strange dancing and singing flower, "...die tanzende Blüte 'Ro-Wa', eine lilienartige Pflanze, deren lange Blütenstengel sich schlangengleich hin- und herbewegten und mit ihren zierlichen Knospen fortwährend anmutige Bewegungen ausführten, indem sie zugleich ein leises Zwitschern wie von Vogelstimmen hören liessen." (I, 59) It is only later, in his story "Die entflohene Blume," that Lasswitz explains these movements and sounds of the plants in terms of a language. (EE 241)

The second peculiarity is an intelligent and trained little animal that could understand and utter a few words. It was a kind of tiny horse with wings:

> Ein allerliebstes, schneeweisses Flügelpferdchen, nicht grösser wie ein kleines Kätzchen, flatterte von dem Büchergestell...auf die Lehne von Las Armstuhl und blickte sie mit seinen klugen Augen ernsthaft an. Das Tierchen sah wirklich aus wie ein Miniatur-Pegasus, nur hatte es statt der Hufe zierliche Zehen, mit denen es sich anklammern konnte. Zoologisch betrachtet gehörte es zu den Insekten und war eine Art Heuschrecke, die aber auf dem Mars warmes Blut besassen und die höchstentwickelte Gruppe der Insekten darstellten. Der Kopf war der eines Pferdes mit fast menschenähnlichem Ausdruck, die Flügel sassen an den Schultern und glichen denen einer Libelle. (II, 86)

Unfortunately, this fantastic little animal does not exist in

the English translation! That Lasswitz' imagination was by no means excessive (or "queer" according to "Haldane's Law") is proven by the recent discovery on our own planet of a weird animal described in a newspaper article as an "elephanttigergoat-dragon:"

> Ein gehörntes und geflügeltes Fabelwesen ist im Dschungel von Ost-Borneo gefangen worden. ... Das rund einen Meter lange Tier hat den Rüssel eines Elefanten, den Körper eines Tigers, die Beine einer Ziege, die vorstehenden Augen eines Drachen und Flügel wie das mythologische Pferd Pegasus. Der Leiter des zoologischen Gartens von Djakarta sagte, dass im Dschungel Borneos wahrscheinlich noch zahlreiche solcher Tiere leben. [19]

The basic physical appearance of Lasswitz' Nu resembles Lowell's Mars, as we saw earlier. Canals were built to collect the melted snow, "und so wurde durch das Kanalnetz das ganze Wüstengebiet mit fruchtbaren, an hundert Kilometer breiten Vegetationsstreifen durchzogen, die eine ununterbrochene Kette blühender Ansiedlungen der Martier enthielten." (I, 103) However, Lowell's oases changed into a concept of a "Weltstadt" or "Riesenstadt, die sich über den grössten Teil des Planeten verbreitete" (II, 33), in long strips. These strips contained the canals in the center, and parallel to them the industrial roads, i.e., the "Stufenbahn." "Ueber den Bahnen erhoben sich, die ganze Breite in kühnen Bogen überspannend, die Riesengebäude des gewerblichen und Geschäftsverkehrs. Diese stiegen bis zur Höhe von hundert Meter an. Das leichte, feste Baumaterial gestattete bei der geringen Marsschwere diese gewaltigen Wölbungen und Säulenmassen." (II, 15) Next to the road and to these early skyscrapers were "gewaltige Riesenbäume, deren Gipfel zum Teil sogar die hundert Meter hohen Gebäude noch überragten..." (II, 16) Under these giant trees, protected from the intense sunlight, stood the one-storied houses of the Martians, all built on rails: "Auf beiden Seiten der Industriestrassen, in einem Streifen von etwa tausend Meter Breite, erstreckten sich die

Privatwohnungen der Martier. Unter dem Riesendach der Bäume dehnte sich ein reizendes Gewirr von Garten- und Parkanlagen aus..." (II, 17) Beyond the houses and gardens came the deep forest above which towered the giant trees. -- Today's city planners may still learn from these ideas of Lasswitz, especially from the law, "dass in jedem Bezirk drei Fünftel des Flächenraums im Innern als Naturpark von jeder Ausbeutung und Bewohnung geschützt blieb, was jedoch eine geregelte Forstkultur darin nicht ausschloss." (II, 18)

Beyond Lasswitz' densely inhabited strips of the plains (which correspond to Lowell's "blue-green areas") lay the deserts and rocky plateaus. The industrial roads through the deserts were less inhabited: "Die Bevölkerung dieser Weltstrassen stand unter ungünstigeren Lebensbedingungen als die der immer feuchten Niederungen, aber sie war doch ungleich besser gestellt als die Bewohner der Wüsten. Hier hausten in der Kultur zurückgebliebene Gruppen der Bevölkerung des Planeten, die zum Teil sogar noch Ackerbau trieben..." (II, 19)

Yet, it was these underdeveloped groups of the desert, called the Beds (in the English translation Bods), that maintained the high cultural standard of the rest of the planet, since only they were resistant enough to work in the limestone mines (the food for all the Nume came from these stones) and in the heat of the plateaus where the solar radiation was collected. (II, 20) In fact, the monetary system was based on the amount of solar energy transformed per year (II, 105) and the whole Martian economy depended upon the income received from this radiation (II, 145-146) with which the political organization of the 154 Martian states was financed. The 3,100 million Nume--"also das doppelte der Zahl der Menschen, auf einer viermal so kleinen Oberfläche zusammengedrängt wie die der Erde" (I, 191)--had different incomes and their taxes were used to support the few unemployed people. No real poverty existed: "Ein Notleiden aus Mangel an Nahrung, Wohnung und Kleidung konnte nicht eintreten, da hierfür durch öffentliche Verpflegungsanstalten gesorgt war. Aber es war natürlich jedem daran gelegen, dieser Armen-

pflege nicht anheimzufallen." (II, 145)

Today's Earth economy is nowhere near this ideal state, at least in the West, as a newspaper article implies:

> The two big problems facing the earth today are shortages of food and energy. Failure to meet these problems successfully already has produced catastrophe in the first instance and threat of economic disaster in the second. ...in contrast with the industrialized capitalist West...Marxist systems are free of today's ominous curses--...famines among the poor, inflation among the rich, diminished energy supplies for everyone.[20]

This is not the place to discuss whether Marxist systems are really "free of today's ominous curses," but it is obvious that Lasswitz envisaged such a society, although definitely not based on the Marxist model. He only restricts "Erwerb von Grund und Boden für den Einzelnen auf ein mässiges Maximum" (II, 38), yet, he thinks that there will always exist--among other things--different classes and standards of living, ideas which he expresses in the novel through Ell who exclaimed as a Nume:

> Die Menschen...werden erkennen, dass es eine Utopie ist, die Gleichheit der Lebensbedingungen anzustreben, dass die Gleichheit nur besteht in der Freiheit der Persönlichkeit, mit der ein jeder sich selbst bestimmt, und dass diese Freiheit gerade die Ungleichheit der Individuen in der sozialen Gemeinschaft voraussetzt. Wir haben ja doch viele Jahrtausende hindurch die sozialen Kämpfe durchgemacht, bis wir erkannt haben, dass der Kampf selbst unvermeidbar, die Gehässigkeit aber auszuschliessen ist, dass in einem edlen Wettstreit alle Stufen der Lebensführung nebeneinander bestehen können. Nur Eines ist dazu notwendig: dem einzelnen die Zeit zu geben, sich selbst zu bilden, zu kultivieren. ... Wir können ihnen /den Menschen/ zeigen, dass das Hin- und Herschwanken des individuellen Besitzes sich nicht ändern lässt und auch nicht geändert zu werden braucht... Denn wir können den

> Menschen die Quelle des Reichtums erschliessen durch unsre Technik, und wir können erzwingen, dass die damit verbundenen Besitzänderungen sich in Ruhe vollziehen. Den kleinlichen Eigennutz, den Krämersinn, die Unduldsamkeit, die Klassenherrschaft bringen wir zum Verschwinden, sobald ein jeder klar zu durchschauen vermag, welche Stelle im grossen Zusammenwirken der einzelnen er ausfüllt. Der tückische, nagende Neid entflieht aus der Welt, und Menschenliebe hält den siegreichen Einzug. (II, 95-97) [my underlining]

In this idealistic vision (characteristically expressed in the chapter "Ideale") we find Lasswitz' most important ideas: the happy future of mankind depends upon technology, education and individual freedom.

Based on these ideals, the Nume society had varying incomes, different social groups, sexual differentiation and many kinds of political governments. The whole administration was supported by an "army of civil servants" (E 213), "ein...Arbeitsheer von sechzig Millionen Personen--'Mann' kann man nicht gut sagen, denn die allgemeine einjährige Dienstpflicht galt für beide Geschlechter." (II, 144) Yet, the training for the professions varied with the sexes: "Nichts lag den Martiern ferner als der Gedanke einer schablonenhaften Gleichmacherei; Gleichheit gab es für sie nur im Sinne der gleichen Freiheit der Bestimmung als Persönlichkeit... Die Frauen erwählten daher Berufsarten, die ihren Eigentümlichkeiten entsprachen..." (II, 162-163) Individuality was carried even further in the different political governments:

> Die republikanischen Staatsformen herrschten vor, aber auch unter ihnen gab es eine bunte Musterkarte von kommunistischen, sozialistischen, demokratischen und aristokratischen Verfassungen. Die Monarchieen waren besonders unter den kleineren Staaten vertreten. ... Die individualistischen Neigungen der Martier konnten daher nach jeder Richtung hin Befriedigung finden. ... Zwischen allen Staaten herrschte, durch

> das Bundesgesetz garantiert, vollständige Freizügigkeit und Erwerbsfreiheit. Wem es in dem einen Staate nicht gefiel, transportierte sein Haus in einen andern... Dadurch war eine natürliche Regulierung dafür gegeben, dass kein Staat seine Machtbefugnis missbrauchte, denn er riskierte sonst, sehr bald seine Einwohner zu verlieren. (II, 142-143)

The humans reacted quite vehemently to so much individual freedom; they could not envisage such a flexible political system without calling it anarchic or utopian:

> Die individuelle Freiheit war so überwiegend, die Entscheidung des einzelnen in allen Lebensfragen so ausschlaggebend und so wenig von staatlichen Gesetzen überwacht, dass vielfach die Ansicht ausgesprochen wurde, das Gemeinschaftsleben der Martier sei durchaus anarchistisch. ... Auf dem Kulturstandpunkte der Menschheit erschienen die Einrichtungen des Mars als Utopien, und mit Recht; denn sie setzten eben Staatsbürger voraus, die in einer hunderttausendjährigen Entwickelung sich sittlich geschult hatten... (II, 191-194)

One of the few instances where a requirement existed for the Nume was the official reading duty (!): "Denn jeder Martier war verpflichtet, bei Verlust seines Wahlrechts, aus zwei Blättern, von denen eines ein oppositionelles sein musste, täglich über die wichtigsten politischen und technischen Neuigkeiten sich zu unterrichten." (II, 71)

It is quite difficult to accept Lasswitz' optimistic view of man, even if we consider that he meant only a relative improvement that would come about over thousands of years. Admittedly, since the Industrial Revolution, man has had only one century to benefit from technology; but two world wars, innumerable wars of independence and the arms race between the two superpowers rather overshadow the fact that indeed technology is giving more free time to millions of people, and that in turn the general standard of education in many countries has improved. We are still so far away from the ideals of Kant

and Schiller that Lasswitz' vision--of individual freedom combined with consideration for society and peaceful coexistence of different political systems--seems utopian right now, although the future may show that it is not an "impossible dream of an ideal state," as Ketterer defines utopia.[21]

The superior culture of the Nume--their advanced technology and urban planning, their economic, social and political differences, and last but not least their high moral standard (which will be discussed later in greater detail)--was rooted in a long and painful historical development.

The different historical periods (missing in the English translation) are only given in context with Martian art, probably because the progress of art depended upon advancing technology. The older art of painting included the archaic period before the invention of a kind of phosphorescent color--"selbstleuchtende Farben"--as well as the agrarian period which was divided into "Zeit der Handarbeit, der Dampfkraft, der Elektrizität und der Energiestrahlung." (II, 37)

> Die neuere Malerei begann erst seit der Erfindung der künstlichen Darstellung der Nahrungsmittel. Zwischen beiden /älterer und neuerer Malerei/ lag eine Periode des Verfalls, die man den dreitausendjährigen sozialen Krieg nannte. Es war dies eine jetzt etwa 18000 Jahre zurückliegende Zeit, in welcher ein allgemeiner Niedergang der Marskultur stattgefunden hatte. Sie war nämlich ausgefüllt durch furchtbare Kämpfe zwischen der ackerbautreibenden und der industriellen Bevölkerung. ... Während dieser Zeit hatte die Kunst keinerlei Förderung empfangen. (II, 37-38)

Only after this long social war were the United Martian States founded on the basis of freedom and complete peace, and art was able to blossom again. Paintings of the newer period, with their special luminous colors, seemed so real that one had the impression of looking directly at nature. (I, 59) The latest development in art, however, was the art of touching. An

enthusiastic lady explained:

> ...die Fingerspitzen, die Handflächen, das sind die wahren Schlüssel zur Schönheit. Und hier im Tasten enthüllt sich die Kunst in ihrer höchsten Freiheit. ...die Gegenstände in den Händen halten und doch nichts von ihnen zu wollen als das reine, freie Spiel des Wohlgefallens, das ist echte Kunst. Spielt nicht ein jeder unwillkürlich mit dem, was er zwischen den Fingern hält? Dies zur Kunst zu erheben, das ist das wahrhaft Geniale! (II, 40-41)

But tastes always differ; the two visitors from Earth in the art museum on Mars do not appreciate this art so much: "'Ich verzichte auf den Genuss. Ich kann nichts spüren als ein abwechselndes Drücken, Ziehen, Prickeln, Reiben--für mich ist das nur eine Art Massage.' 'Mir ging es auch so. Es ist eine Kunst für Blinde.'" (II, 42) Yet, history and art reveal the ethical and cultural progress of the Nume.

Religion is rarely mentioned in this novel. One of the few examples is the exciting moment when the humans are on the space station above the North Pole and see for the first time how small their Earth is in comparison with the universe:

> Noch niemals war es ihnen so klar zum Bewusstsein gekommen, was es heisst, im Weltraum auf dem Körnchen hingewirbelt zu werden, das man Erde nennt; noch niemals hatten sie den Himmel unter sich erblickt. Die Martier ehrten ihre Stimmung. Auch sie, denen die Wunder des Weltraums vertraut waren, verstummten vor der Gegenwart des Unendlichen. Die machtvollen Bewohner des Mars und die schwachen Geschöpfe der Erde, im Gefühle des Erhabenen beugten sich ihre Herzen in gleicher Demut der Allmacht, die durch die Himmel waltet. Aus der Stille des Alls sprach die Stimme des einen Vaters zu seinen Kindern und füllte ihre Seelen mit andächtigem Vertrauen. (I, 232)

This passage shows (besides sentimentality) that even the Martians believe in God. They trust that He is kind--Jo, when telling

of his adventure at the South Pole, exclaims: "...Gott war gnädig, wir sind heimgekommen." (I, 214)--and that He can be asked favors (which may not materialize)--after the encounter with the British warship Ill utters: "Gott gebe, dass diese Begegnung kein Vorzeichen ist." (I, 415) There is a possibility that these two examples may simply be figures of speech emptied of their real meaning, but in one instance Lasswitz is a bit more explicit and hints at a new approach to religion in the words of Ell (again, this interesting idea is missing in the English translation!): "Da ist der religiöse Glaube; er ist die Form, wie die Persönlichkeit das Weltgesetz in ihr Gefühl aufnimmt; die Menschen aber machen daraus ein Bekenntnis, das andre verpflichten soll und sich damit aufhebt. ... Stets werfen sie das Verschiedene zusammen als Eines, indem sie es mit falschen Gefühlswerten belasten." (II, 94)

It is unfortunate that Lasswitz, who proposed new forms of art, did not develop the notion of religion, although the first examples--which may be concessions to his time--could indicate that he himself was too conventional for such a new approach or was not able to handle a subject involving feeling (as we will also see in certain passages concerning love). In fact, it might have been better if he had simply omitted these allusions, for the few references to religion take the reader by surprise; the author does not provide an adequate explanation of religion or the concept of God, and it is somehow disappointing that the Martians, who had advanced in so many other instances, should not have evolved in this sphere--be it even toward agnosticism.

Only when comparing these ideas with his remarks in "Ueber Zukunftsträume" (Z 467-468) do we get a clearer notion. It is here that Lasswitz defines religion as: "...der Glaube, dass es eine unendliche Macht gibt, die sich der Gesetzlichkeit der Natur als des Mittels bedient, den sittlichen Willen der Persönlichkeit zu verwirklichen." It consists of a deep confidence that despite all difficulties the moral law represents "den einzigen Weg zur Glückseligkeit." This faith is "eine subjektive Gewissheit, die uns nur als Gefühl gegeben ist." History

showed that religion does not always produce cultural progress because of fanaticism that kills "Freiheit des Gedankens" and "Quietismus" that leads to "Verzicht auf die lebendige Arbeit in der Menschheit, zu einer Weltflucht." Thus, for the progress of humanity, ethics and religion are not enough: "...das Gute und das Religiöse sind Ideen,...sie weisen das Ziel; aber dazu bedarf es der Hilfe anderer Gesetze, Thatsachen des Seienden, nämlich der Mittel..." One of the means is "Erkenntnis"--it becomes man's task, "Vernunft zur Herrschaft zu bringen in der Welt, und Natur zu verwandeln in Kultur, in Gerechtigkeit, in Schönheit und in Liebe." There seems to exist a path of the will: ascetism, as tried in India or by monks in the Middle Ages. However, "...es ist ein Weg für einzelne Menschen, nicht für die Menschheit. Diese kann nicht die Welt fliehen, sie muss sie bestehen. ...unabweisbar fordern die Massen ihr Recht am Leben." These masses need education (and technology) in order to learn to protect themselves against desire as well as against the power of nature.

The major differences on Nu in contrast to Bà--urban planning, the economic, social and political systems, history and art--can be understood only through the development of the ideas on individual freedom ("Freiheit der Persönlichkeit") as well as through the progress of science and technology, although again, technology is nothing but the means toward the goal of numedom.

In appearance, the Martians looked very much like human beings. There were only minor discrepancies. Probably the most striking feature was their large expressive eyes:

> Die grossen Augen, die allen Martiern eigentümlich sind, wechselten je nach der Beleuchtung von einem lichten Braun bis zum tiefsten Schwarz. Denn entsprechend den starken Helligkeitsunterschieden, welche auf dem Mars herrschen, besitzen die Bewohner

> desselben ein sehr weitreichendes Accomodationsvermögen, und bei schwachem Licht erweitern sich ihre dunklen Pupillen bis an den Rand der Augenlider. Das Mienenspiel gewinnt dadurch eine überraschende Lebhaftigkeit, und nichts pflegte die Menschen mehr an den Marsbewohnern, nachdem sie sie kennen gelernt hatten, zu fesseln, als der ausdrucksvolle Blick ihrer mächtigen Augen. In ihnen zeigte sich die gewaltige Ueberlegenheit des Geistes dieser einer höheren Kultur sich erfreuenden Wesen. (I, 63)

Their hair had fascinating colors. La's hair "hatte eine auf Erden nicht leicht zu findende Farbe, ein helles, etwas ins rötliche schimmerndes Blond, einigermassen der Theerose vergleichbar; in bezaubernder Zartheit erhob es sich wie eine Krone über dem weissen, reinen Teint ihres feingebildeten Antlitzes." (I, 63) Se's hair was light brown: "Die Haare... irisierten...bei jeder Bewegung, wie das Farbenspiel auf einer Seifenblase." (I, 78) And her movements "glichen dem leichten Schweben eines Engels." (I, 78) The clothing of these women was equally beautiful, phosphorescent and foreign to the human eye. (I, 63-64, 166).

It is noteworthy that Lasswitz mentions most of these romantic phenomena in connection with Martian women and that in fact one of the chapters is called "In der Pflege der Fee." (I, 73-86) Thus, these exterior differences give a certain mood, but are of small importance in the context of the whole novel.

The extreme intelligence of the Nume, "diese bewundernswerte Feinheit der Organisation des Martiergehirns," soon became evident to Saltner and Grunthe: "Ein Gefühl der Demütigung, das ja nur zu natürlich war, wenn der Stolz des deutschen Gelehrten einer höheren Intelligenz sich beugen musste, wollte im Anfang die Gemüter verstockt machen. Aber es konnte nicht lange vor der übermächtigen Natur der Martier bestehen. Es wich widerstandslos der ungeteilten Bewunderung dieser höheren Wesen." (I, 156) (The reference to the pride of the German

scholars is one of the few ironic remarks in the novel; as we mentioned earlier, Lasswitz' humor shows mainly in his short stories.) It was this intelligence that gave the Martians the power to subdue nature through technology and to overcome their personal desires for the higher goal of numedom.

Let us now look at Kantian ethics, in which reason is supreme. Emotions and reason, or personal interest and the moral will, are opposed:

> In Kant's view, the will of man considered as a rational being must be regarded as the source of the law which he recognizes as universally binding. This is the principle of the autonomy...of the will. ... The will or practical reason, considered as such, legislates, and man, considered as being subject to a diversity of desires, impulses and inclinations, ought to obey. [22]

Kant sees a relation between the moral will and the categorical imperative: "Act as if the maxim from which you act were to become through your will a universal law."

Lasswitz' concept of numedom in turn is related to the moral will. The Martians explain numedom to the humans in these words:

> Wenn aber nicht Ihr individueller Wille, sondern Ihr sittlicher Wille im Spiele ist, Ihre freie Selbstbestimmung als Persönlichkeit, oder wie Sie das nennen, was wir als Numenheit bezeichnen--dann giebt es keine Macht, die Sie hindern kann. ... Ihr Wille ist nichts gegen den unsern, nur das Motiv des Willens gilt. Giebt es eine gemeinsame Bestimmung der sittlichen Würde zwischen Numen und Menschen, so werden Sie Freiheit haben; giebt es für Menschen nur Motive der Lust, so werden Sie uns nie widerstehen. (I, 268) [my underlining]

The underlined words are the keywords for the understanding of numedom in contrast to human egotism.

Sometimes one has to be careful with Lasswitz' terminology

which may contain similar words for opposite ideas; for instance, in relation to the choice of the preferred political Martian state, Lasswitz uses the term "individuelle Freiheit" in connection with the concept of numedom (II, 191), while in the last quotation he uses "individuell" in the sense of egotistic, so that the individual will is opposed to the moral will which is bound by the universal law. The word "Wille" as related to "individual" or "egotistic" is not exact and should have been replaced by "desire" or "lust" (as Kant did in contrasting desires, impulses and inclinations to the will or to practical reason).

The moral will, then, or "die Freiheit der Persönlichkeit," cannot restrict the freedom of any other person and is "limited" because it has to bow to the higher goal of humanity or, specifically, to the peace between the two planets: "Die höhere Pflicht, die Ordnung zwischen den Planeten, erfordert diesen Verzicht des einzelnen auf seine Freiheit." (II, 136) As stated earlier, Lasswitz had already expressed the conflict between reason and emotion, or will and desire, in Bilder aus der Zukunft as well as in "Apoikis," referring not only to Kant but also to Schiller. He is concerned with the individual that forms an important part in the improvement of the whole of mankind, a notion which is based on Schiller's famous maxim: "Und kannst du selber kein Ganzes werden, als dienendes Glied schliess' an ein Ganzes dich an."

The chapter in the novel titled "Ideale" (II, 86-99) can be summarized in the following contrasting chart that constitutes the philosophical quintessence of this work:

Mensch	Nume
Ehre in Aeusserlichkeiten	innere Freiheit, Freiheit der Persönlichkeit
fremde Meinung	eigene Vernunftbestimmung
Dummheit, Unwissenheit	Bildung, Erziehung
Willensschwäche, Faulheit	Einsicht
Egoismus, Lust	Pflicht
Affekt	Besonnenheit
Leidenschaft	Verstand

Gefühl	Gedanke
falsche Gefühlswerte	Aufklärung, Lehre
Kinder	Erwachsene
Barbarei	Kultur
Krieg	Frieden

The Nume want to teach the humans that inner freedom and truth are more important than honor (cf. also II, 292), that passion can be guided by reason and that ignorance makes the humans unhappy and unjust: "Denn sie sind nicht böse. Sie wollen das Gute, sie wollen die Freiheit. Ihr Gefühl ist lebendig und warm. Darin sind sie uns gleichstehend..." (II, 89) The Martians feel obliged to share their understanding of numedom with the humans, though the Bate cannot be forced to accept it:

> Es ist uns eine heilige Pflicht, das Resultat unserer hunderttausendjährigen Kulturarbeit, den Segen der Numenheit, auch den Menschen zugänglich zu machen. ... Ihre Freiheit werden wir achten, denn sie ist die Grundbedingung zur Numenheit. Die Kultur kann nicht aufgedrängt und nicht geschenkt werden, denn sie will erarbeitet sein. Aber zu dieser Arbeit kann man erzogen werden. (I, 294) [my underlining]

Freedom is apparent not only in the individual choice of profession or of a certain state in which a Martian prefers to live, but also in art and in love. In art--"das reine, freie Spiel des Wohlgefallens, das ist echte Kunst." (II, 41) Love is "das ästhetische Spiel bewegter Gemüter, das die Freiheit der Person nicht beschränken kann." (I, 162) Thus, both La and Se "bind" Saltner in a free game of love that he finds difficult to understand. (I, 216) When later Saltner becomes jealous of Ell, who spends much time with La, she accuses Saltner of taking away her freedom:

> Und Du willst mich unfrei machen? Willst dem Gefühle gebieten? Ist ein Nume so klein und einfach, dass ein einzelner seinen Kreis erfüllen könnte? ... Wer kann sagen, ich repräsentiere alles, was Du lieben kannst? ... Wenn ich dir nachgebe,...dann bin ich keine Nume mehr, dann bin ich ein Mensch! Aus dem

> reinen Spiel des Gefühls verfalle ich in den Zwang der Leidenschaft... Darum müssen wir scheiden,...denn in dieser Liebe zu Dir verlöre ich meine Freiheit. (II, 185-187)

Only after a long inner fight, when she understands that freedom can make one unfree, does La follow Saltner to Earth:

> Ich habe gekämpft um meine Freiheit, um meine Würde... Ich habe mich aufgerieben in diesem nutzlosen Kampfe. ... Würde des Numen! Ist sie noch Würde, wenn sie erhalten wird durch den äusseren Zwang? Nein,...es wurde mir klar, Würde wie Freiheit wiedergewinnen konnte ich nur, wenn ich selbst mich hingab... Die Bestimmung ist nur eine, es ist die der Vernunft im zeitlosen Willen, dass ich sein soll, und dass wir das eine, dasselbe Ich sein sollen,--das ist die Liebe. Dieser Bestimmung folgen ist Freiheit. (II, 407-408)

This union of La and Saltner, a result of higher freedom, symbolizes the final peace between the two planets. It also shows that the Martians have not arrived at a cultural utopia but still undergo developments.

The superior attitude of the Nume could sometimes become unpleasant for the humans. The latter were often called "Ko bate," which meant: poor humans. (I, 78, 94 etc.) Even the tiny flying horse had learnt these words. (II, 87) After the rescue on the artificial island, Saltner was treated by Se with a certain pity: "Wie man ein Schosshündchen streichelt, glitt sie mit der Hand über sein Haar... Er kam sich...etwas gedemütigt vor, denn er merkte wohl, dass ihn Se nicht als ein gleichberechtigtes Wesen behandelte." (I, 79) Saltner and Grunthe were handled like children, "...denen man ihre Thorheit liebevoll nachsieht, während man sie zu besserem Verständnis erzieht. Aber...die Martier, wenigstens diejenigen der Insel, waren viel zu klug und taktvoll, als dass sie je ihre Ueberlegenheit in direkter Weise geltend gemacht hätten." (I, 157) Ell, though only half Martian, was sometimes a bit haughty (II, 90) and impatient or cold, even with his own human friends:

"O Ihr Blinden! ... Seht Ihr denn nicht, dass Ihr nichts anderes seid als Sklaven, Sklaven der Natur, der Überlieferung, der Selbstsucht und Eurer eigenen Gesetze, und dass wir kommen, Euch zu befreien, dass Ihr nur frei werden könnt durch uns?" (II, 110) Little could Ell guess that some Nume were to become slaves too!

The contact with the humans had a barbarizing effect on some Martians. Already the first meeting with the humans, in this case the English, was a bad omen. Some crew members and the captain were hurt. Ill (in the English translation Yll), the Martian commissioner, regretted:

> Das also ist unser erstes Zusammentreffen mit den Menschen, das ist die Verbrüderung der Planeten! Ich hatte es mir anders gedacht. Ich höre, die Menschen haben unsern Planeten nach dem Gotte des Krieges genannt; wir wollten den Frieden bringen, aber es scheint, dass die Berührung mit diesem wilden Geschlecht uns in die Barbarei zurückwirft. (I, 415)

When the Antibaten group gained power on Mars, La exclaimed: "Meine Befürchtung! ... Die Berührung mit den Menschen bringt einen Ton in unser Verhalten, wie er sonst im öffentlichen Leben nicht Sitte war. ...die antibatische Bewegung setzt eine Verrohung des Gemüts überhaupt voraus." (II, 102) La was also right with her other remark: "...ihr Menschen werdet uns vergessen machen, dass Gewalt ein Uebel ist, unwürdig--." (II, 99) Because of the wars on Earth, the Antibaten were able to force the government to declare the protectorate over the entire Earth (II, 242-243), a decision which provoked opposition of the humans against the Martians.

The Nume on Earth were not improving either. Due to the climate and humidity some began to suffer from a psychosis called "Earth fever" (Erdkoller) and became despotic. (II, 302) One of the worst examples was Oss, the instructor of Bozen, who assumed special privileges and misused his office. (II, 331-340, 344 etc.) He was the one who at the end thought out two plans to destroy mankind: one by slowing down and finally stopping

the rotation of the Earth (II, 530-531), and the other by not fighting an illness that was "imported" from Mars and began to affect the humans (II, 533). Oss had become the head of the Antibaten party while Ell was his opponent in the Philobaten party. The Antibaten only wanted to exploit Earth and her energies in order to increase the income of Mars. In due time Russia was fiercely subdued by the Martians and the United States were supposed to be next. (II, 507, 511)

That all these excesses led to the insurrection of mankind is understandable. The motto of the league of humanity became: "Numenheit ohne Nume!" (II, 387) And only the victory of Ell's party and the sacrifice of his life made the final peace treaty between the two planets possible, a treaty that gave freedom and self-determination to the Bate.

Lasswitz' Martians, so similar in outer appearance to the humans and yet so much superior in intelligence and ethics, were neither gods nor perfect rational beings and had to undergo some of the same trials and temptations as the humans. Lasswitz had aesthetic reasons for making his Nume humanoid, as he explains in his essay "Unser Recht auf Bewohner anderer Welten" (1910) published posthumously in Empfundenes und Erkanntes:

> ...es ist eine unentbehrliche Voraussetzung für die dichterische Wirkung, dass wir uns in das Erlebnis der geschilderten Geschöpfe mit unserm eignen Erlebnis versetzen können. Das ist aber bei Geistern mit Flammenkörpern von glühendem Wasserstoff oder bei intelligenten Bazillen, die in flüssiger Luft sich fortpflanzen und amüsieren, schlechterdings nicht möglich. Denn für solche Wesen existieren ganz andre Formen der Sinnlichkeit; sie müssten Empfindungen haben, wie wir sie nicht erleben und daher nicht nachfühlen können. (EE 169)

Although Lasswitz admits, concerning extraterrestrials, "ich halte es...für wahrscheinlich, dass sie von unserer Gestaltung stark abweichen" (EE 169-170), and he proposes in "Gegen das Weltgesetz" "siebenstrahlige Marsbewohner" who may have a seven-

dimensional perception (B II, 148), he still justifies his humanoid Nume on the basis of the scientific possibility, "dass, wenigstens auf den vier innern Planeten, Merkur, Venus, Erde und Mars...das organische Leben ganz ähnliche Entwicklungen durchläuft..." (EE 170) In fact, he concludes his essay on extraterrestrials by insisting that--besides aesthetic and scientific reasons--one may have religious reasons for believing in intelligent ETs, and as long as fiction and religion do not contradict scientific facts, one has the right to believe in ETs. (cf. EE 171-174) In his essay "Der tote und der lebendige Mars" [1910?] Lasswitz mentions that since the opposition of the two planets in 1909, Mars has been declared "dead," i.e. too cold and too dry for civilized beings (EE 175); yet, hypotheses about Mars "alive" can be "brauchbar und berechtigt:" "Derartige Überlegungen werden dann kein blosses Spiel müssiger Phantasie sein, wenn ein wertvolles Interesse vorliegt, mit solchen Gedanken zu operieren. Der Aufblick zu einer höheren Kultur, als die Menschheit sie bietet, bedeutet ohne Zweifel ein solches höheres Interesse, den Zug nach einem Ideal, das tief in der menschlichen Seele wurzelt." (EE 184)

Therefore, Lasswitz' interest lay not only in humanoid Martians who would have senses similar to our own, but also in beings with a superior culture who would represent an ethical paragon. This deep concern for man and his improvement--that is unfortunately the source of the unpleasant didactic tone in the novel--is based on Lasswitz' idealism. The Nume, then, are a symbolic version of the homo futurus. Consequently, the future of mankind lies in education and technology, i.e. in overcoming passion and nature, as Lasswitz concluded his essay "Ueber Zukunftsträume:"

> Lernen müssen alle, was gegen Begierden wappnet und gegen die Macht der Elemente schützt. Und da gibt es für die Menschheit nur jenen ersten und einen Weg, durch die Erkenntniss, durch die Bildung. Je höher die Bildung der Gesammtheit, umso näher das Ziel! ... Und so komme ich zu dem Schlusse, dass, wie für die ethischen und religiösen Ideale, auch für die ästhe-

> tischen der Fortschritt der Entwicklung durch die technische Vervollkommnung auf Grund der Intelligenz geboten ist. Hier liegt der Weg der Zukunft. (Z 468, 483)

This notion is certainly not outdated, for we can find it again, expressed in a similarly urgent tone in one of Clarke's essays:

> Education: that, ultimately, is the key to survival in the coming world of ultraintelligent machines. ... The problem which has to be tackled within the next fifty years is to bring the entire human race, without exception, up to the level of semiliteracy of the average college graduate. This represents what may be called the minimum survival level; only if we reach it will we have a sporting chance of seeing the year 2200. [23]

In spite of their high intellect and knowledge Lasswitz' Nume do not always behave in accordance with the principles of their ethics. Lasswitz also depicts a negative development in their character (cf. the Antibaten party) toward haughtiness and despotism. As Bölsche indicates, this change begins in the third part of the novel (the first representing the encounter between the two "races," the second the fascinating description of Mars):

> /Lasswitz/ gerät aus der reinen Schilderung einer glänzenden Überwelt...heraus in ein ganz anderes Fahrwasser: in die Zeitsatire. Man fühlt den kühlen Atem von Tendenz. ... Die Martier, anfangs ganz ins Grosse gemalt und wesentlich dadurch interessant, fallen, je weiter das Buch rückt, immer mehr ab... ...dienen schliesslich mehr und mehr satirischem Zweck. Sie benehmen sich trotz ihrer Ethik der roheren Menschenkultur gegenüber genau so, wie gewisse liebe Kultureuropäer sich trotz des Christentums gegen wehrlose Wilde benommen haben. ...der optimistische Ausgang behält einen vom plastischen Kunstwerk nicht bewältigten lehrhaft trockenen Rest. Und man glaubt auch nicht recht an die zukünftige Ethik der Menschen,

> nachdem die Martier, die das seit Jahrtausenden hatten, so jämmerlich gescheitert sind... [24]

This behavioral change of the Martians is puzzling in view of the novel's fundamental thesis. One may suspect that our philosopher was not able to translate theory into practice--following Rottensteiner's critique: "Seine Charaktere reden wohl viel von ihren Prinzipien, aber sie verkörpern sie nicht." [25]--, or for some time he may have been more interested in satire than in ethics and what he called the "Aufblick zu einer höheren Kultur" (EE 184). Possibly he also realized that his first picture might have been too ideal, or did he intend to show that even the homo futurus will not be perfect? Whatever his real purpose may have been, the third part of the novel is anticlimactic and the ending unconvincing.

In the novel the humans are often referred to as savages (like in "Apoikis"). Confronted with all the marvels of technology, Saltner admitted: "Das hilft nun nichts,...wir spielen einmal hier die wilden Indianer..." (I, 158) In a discussion between La and Saltner concerning love and desire, La exclaimed in despair: "O, was seid ihr für Wilde!" (I, 251) And later Se granted that Saltner's understanding of the situation on the island was quite correct: as Europeans who discovered gold in an uncivilized area would hinder the savages to return to their kinsmen because of security for the Europeans, so the Nume preferred to convince Saltner and Grunthe not to return to Earth, with the only difference that they could not hold them back by force, for ethical reasons. (I, 266-267) On the arrival of the spaceship with the first humans, a frightened Martian mother asked her neighbor: "Ist es denn wahr,...dass die Menschen kleine Kinder fressen?" (II, 4) And an Antibaten article about conditions on Earth warned against the humans: "Es sind wilde Tiere, die wir zu bändigen haben. ... Wir halten es für sinnlos,... dass zwischen Wilden wie den Erdbewohnern und zwischen Numen überhaupt eine Verbindung verwandtschaftlicher Art stattfinden

könne." (II, 102-103) The same article contained a description of Saltner as seen through the eyes of extremist Nume:

> ...ein richtiges Exemplar der Menschheit hatten wir zu betrachten das zweifelhafte Vergnügen. Wer dieses stupide Gesicht mit den blinzelnden Punkten, die Augen sein sollen, diesen unanständigen, ungefärbten Anzug, diese rohen Bewegungen einmal gesehen hat, der wird sich sagen, diese Rasse kann von uns nur als vielleicht nutzbares Haustier geduldet werden. (II, 103)

Thus, in comparison with the Nume, the humans do not fare favorably, but when contrasted among themselves, the perspective somehow changes. When Saltner and Grunthe arrived at the island they were welcomed as the first civilized people: "Gegenüber den kleinen, unansehnlichen, schmutzigen und thranduftenden Eskimos erschienen ihnen /den Martiern/ die stattlichen Figuren der Europäer in ihrer reinlichen Tracht schon äusserlich als Wesen verwandter Art." (I, 151) In fact, the Nume were indifferent to the language of the Eskimos and they liked German, "/da/ das Deutsche als Sprache eines hochentwickelten Kulturvolkes dem geistigen Niveau der Martier soviel näher stand." (I, 155)

Probably Lasswitz would have been wiser not to speak of the Germans as a "hochentwickeltes Kulturvolk" and of the English as haughty and overproud (I, 406; II, 226), but it is not justified to accuse him of nationalism and imperialism, as Kretzmann did:

> Several little incidents cast interesting sidelights on contemporary conditions. The English, of course, are to blame for antagonizing the Martians. ...we are asked to believe that the English are defeated for moral reasons, rather than because of inferior technical equipment. The Martians are able to vanquish them because the English have only the interests as their nation and not the good of humanity at heart. It becomes quite evident that the Martians are really a glorified German race and have the same imperialistic tendencies as that nation: "It is our solemn duty to

> bring to humans the blessings of our [Martian] culture..." [26]

It sounds rather as though Kretzmann himself was influenced by contemporary conditions (the article was written in 1938), since he overlooked part of Lasswitz' following sentence: "...kein Martier vermag den Griff des Nihilitapparates zu drehen,...wenn ihm der Mensch mit festem, sittlichen Willen gegenübertritt... Aber jene Engländer--und wir sind nicht besser--hatten nur das eigene Interesse, ihren spezifisch nationalen Vorteil, nicht aber die Würde der Menschheit im Auge..." (II, 233) [my underlining]. These words clearly show that Lasswitz was against nationalism.

In fact, the anonymous writer who had accused Lasswitz of "technischer Chiliasmus" certainly did not think that Auf zwei Planeten gave a nationalistic picture. Obviously his monarchist and militarist feelings were hurt when the peaceloving Martians disarmed the entire Prussian army by means of a huge magnet that also turned horses upside down because even horseshoes were attracted. (II, 282-284) This is quite a humorous picture which our anonymous writer did not appreciate:

> ...die soldatenhassende Phantasie, die...in der Vorstellung eines Kampfes schwelgt, bei dem die deutschen Fürsten samt ihren tapferen Reitern...in lächerlicher Weise Gefangene der Martier werden, offenbart freilich keine Prophetengabe für die Zukunft, aber die geheimsten Wünsche der Kreise, denen dieser Roman entstammt. [27]

He implies that Lasswitz was a republican, which is incorrect since Lasswitz' Martian States include all forms of government. The writer also complains about "...die erhabene Vernünftigkeit der Marsbewohner, mit der sie vor allen Dingen über die kleinlichen armseligen Vorurteile von Volk, Vaterland und ähnlichen Dingen hinaus sind." [28]

If the Martians are "a glorified German race," Kretzmann must have forgotten the third part of the novel where they are depicted in a negative way. Most probably Lasswitz--like Wells--used their "imperialistic tendencies" to criticize the coloni-

alism of his time with its rationalizations and prejudices. He was quite eager to point out that the haughty thinking of the Martians was wrong and that a protectorate was not a good solution since culture cannot be forced upon anybody. The novel as a whole reveals the author's concern with humanity as such, and not with single nations. The picture of the humans as savages must also be understood within this larger context: Lasswitz satirized human weaknesses in order to lead mankind toward a higher ethical standard.

The relationships among the main characters are somewhat complicated. There are two inter-connected triangles: Ell, Isma, Torm on one hand, and Saltner, La, Se on the other, linked together by the friendship between Ell and La. Grunthe, the typical German scholar, stands more or less by himself.

Ell is the most important figure. He is the son of a Martian--All, who was stranded on the South Pole during one of the early expeditions to Earth--and of a German schoolteacher. Ell studied astronomy, had his own observatory in Friedau (where Isma and Hugo Torm lived) and was the sponsor of the expedition to the North Pole. (I, 274-275) Many years ago he had asked for Isma's hand, but she had declined his offer because he sometimes seemed so strange to her. (I, 340) Instead she had married Torm whom she loved deeply. Ell who still loved her remained a very good friend. This situation was, of course, a source of conflicts.

It was only after the success of the expedition and the discovery of the Nume at the North Pole that Ell admitted his half-Martian origin. Isma now understood: "Das Fremdartige seines Wesens, selbst seiner Erscheinung, das sie anfänglich abgestossen, später so viel stärker gefesselt hatte, als sie sich selbst gestehen mochte--alles wurde ihr auf einmal erklärlich." (I, 331)

Though Ell could be haughty and cold when thinking of the

higher task of numedom (II, 109-111), he was extremely considerate with Isma. Only for a short time did his feelings toward La become more important: "Dieser Verkehr war so beglückend, so frei von dem dunkeln Hintergrund irdischer Fesseln! Das war Numenart, zu geben und zu nehmen!" (II, 140)

After Torm had been lost for over a year, Ell had to admit to himself, "dass es wie eine leise Hoffnung ihn durchzog, ob es ihm nicht möglich sei, ihr /Isma/ das entschwundene Glück zu ersetzen." (I, 350) And when it became known that his friend Torm was still alive, Ell could not master his feelings anymore because Isma had given him some signs for hope:

> Nein, er konnte sich nicht freuen, er wollte nicht! Das Glück war ihm so nahe, die erträumte Zukunft so schön... Ja, es war anders geworden, er sah schon lange nicht mehr in ihr die Freundin, der er geschworen hatte zu dienen ohne Verlangen. In verzehrenden Flammen loderte in ihm die Leidenschaft, sie zu besitzen! Sie wieder zurückkehren zu sehen in die Arme eines andern--nein, es war nicht mehr möglich. Es konnte nicht mehr so sein, nimmermehr konnte er neben ihr hergehen in ehrlicher Entsagung-- -- Wenn er jetzt die Geliebte verlor, so verlor er auch die Freundin... Dann musste er fort, er durfte sie nicht mehr sehen... (II, 480-481)

Except for the first two sentences, this quotation--which shows the impulsive and un-Nume side of his character--is missing in the English edition, probably because of its sentimentality. (cf. E 346)

Even though Ell found out that Torm had committed a crime (he had hit a Martian, in self-defense), Ell could not take revenge. After a long inner fight he let Torm go (II, 493-497), resigned as Kultor of Germany (a second reason being that some Martians did not like to see him, a half-Martian, in such a high position) and returned to Mars in order to fight the Antibaten. Ell lost his life in a critical moment when fast communication was needed to announce the peace treaty between the two planets. (II, 540-541) At the end of the novel Saltner said of Ell:

"Das Andenken dieses Edlen ist unvergesslich... Er war der Führer auf dem Wege, den die Welt nun wandeln kann zur Freiheit und zum Frieden." (II, 545) For once the English translation is more explicit by adding: "Ell has won a great victory over himself and for the world, and he died for it; no man, whether human, whether Nume, could wish anything better." (E 375) He died for a task that he had once described with these words: "...meine Pflicht ist die Versöhnung der Planeten. Dagegen muss das Geschick des einzelnen zurücktreten." (I, 364)

Thus, Ell as a Nume could be cold toward the humans and as a Bate emotional, even passionate and jealous. Yet, in the end, reason outweighed desire so that he became a paragon of high (Kantian) ethics.

Isma is not torn between two planets, like Ell and La, but between two persons: Ell and Hugo Torm. She definitely loved her husband but also had strong feelings for Ell. Thus, when she heard about Torm's disappearance, she accused herself of having endangered her husband's life because of Ell's interest in the expedition:

> War sie nicht mitschuldig an seinem Unglück? Hatte sie nicht zu sehr dem Freunde vertraut, der des Gelingens so sicher schien? ... Sie hatte sich eingebildet, der grossen Sache, der Wissenschaft mutig das Opfer ihres häuslichen Glückes zu bringen, aber nun kam es über sie wie eine schreckliche Anklage--hätte sie den Mut auch gehabt, wenn nicht Ell sie gebeten hätte? Wenn sie nicht dem Freunde zuliebe, dem sie das eine Lebensglück versagt, nun zur Erreichung seines innigsten Wunsches ein Opfer hätte bringen wollen? Und wenn das Opfer angenommen war? Sie schauderte zusammen. (I, 353)

As a kind of repentance for Ell and herself she decided to take the Martian airship to the North Pole in order to search for Torm. Ironically though, this trip separated her even longer from her husband: she and Ell had to spend half a year on Mars because the airship was damaged during the fighting with the

British, and winter was approaching so that the Martians had to leave their station at the North Pole.

During this involuntary stay on Mars, Isma depended very much on Ell and became even jealous of La:

> ...wenn Ell mit La bei ihr zusammentraf, wie seltsam pflegte er sie anzusehen! Sie kannte diesen Blick. ... Sie mochte die beiden nicht zusammensehen. Ein Gefühl der Kälte durchzog ihre Seele und machte sie feindselig und unwirsch gegen La wie gegen Ell. ... Sie hatte jedes Recht auf ihn aufgegeben, sie hatte es zur Bedingung ihrer Freundschaft erhoben, dass er sich keine Hoffnungen mache, mehr von ihr zu besitzen, als diese Freundschaft. Wie durfte sie ihm verwehren, eine andere zu lieben, da sie selbst verzichtet hatte? Und doch jedesmal, wenn diese Gefahr zu drohen schien, fühlte sie sich von Eifersucht ergriffen, die sie sich nicht gestehen wollte, und die sie doch ohne ihren Willen ihm durch ihr Benehmen eingestand. (II, 122-123)

Isma's deep conflict becomes evident in the two important questions about her feelings, the last of which remained unanswered:

> Warum sagte sie ihm [Ell] denn nicht, hier, frei von allen Menschensatzungen, dass sie nicht ohne ihn sein wolle, dass sie ihn nicht entbehren wolle, nicht könne? Warum? Weil sie ihn ja doch nicht lieben--wollte! Und warum konnte sie sich nicht von ihm losreissen, da sie doch ihren Mann liebte, da sie ausgezogen war, ihn zu suchen in den Öden der Polarnacht, und da sie zu ihm zurück wollte durch die Leere des Weltraums? (II, 124)

At a certain moment, after Torm had been missing for over a year, Isma indirectly showed Ell that she had thought about marrying him but was not able to talk about it until Torm's death was certain:

> "Isma", sprach er [Ell] leise, "wollen Sie nicht bei mir bleiben?" Sie drückte seine Hand, ohne sie ihm zu entziehen. "Sie wissen, Ell" antwortete sie ebenso leise, "dass ich es nicht darf, ja auch nicht will, so lange noch eine Möglichkeit ist--" "Aber wenn einmal

die Zeit kommt, dass keine Möglichkeit mehr ist?"
"Dann sprechen wir wieder davon. Bis dahin--Sie kennen meine Bitte.--Wo ist die Grenze zwischen Gedanke und Wunsch? Und das ist Frevel." (II, 320-321)

These last three quotations concerning Isma's inner conflicts of jealousy and love are omitted in the English edition, even though they reveal more about Isma than most of the other passages. Since this novel already suffers from a lack of characterization, the omissions may be deplorable but can again be justified because of the sentimentality of the passages.

All in all, Isma is a person torn between love for her husband and affection toward her friend Ell. Like Ell, Hugo and Saltner she experiences jealousy, but unlike Ell and La she cannot or does not want to solve her conflict; circumstances do this for her.

Hugo Torm is even less characterized than Ell and Isma although he has a conflict too: he wavers between love, jealousy and honesty. Out of love for Isma and distrust towards Ell, he decided to flee from the North Pole station, hidden in an airship. After its landing (in Tibet instead of England, as he had hoped) he hit and probably hurt a Martian in order to escape. Under Martian law this deed could be severely punished, as he realized after his return when he read about a man who had also wounded a Nume and had been deported into the Martian desert. (II, 412-413) Thus, Torm felt like a criminal and decided not to reveal his return, not even to Isma: "Weil er vor ihr stehen musste als ein Verbrecher... Nein, nein, dann lieber, diesen Schmerz ihr ersparen! Dann lieber sie in dem Glauben lassen, dass er verschollen sei..." (II, 416)

When finally Isma found out that he was back, she went to see him and showed her love by comforting him: "Was Du auch gethan, Du thatest es, um zu mir zu kommen, nun trag' ich mit Dir, was geschehen soll." (II, 489) They could flee with La's help, but Torm had become too embittered against the Nume and proudly rejected that offer: "Ich nehme keine Gnade an von denen, die ich als Feinde der Menschheit betrachte; von den Vernichtern

meines Glücks--das geht nicht!" (II, 489) His honesty forced him to admit everything to Ell, since Ell was the Kultor of Germany. Even when Torm found out that all the Martians in that airship had been slaughtered before their return and Ell gave him the opportunity to deny what he had just explained, Torm courageously said: "Hätte ich gewusst, was ich jetzt weiss, ich hätte vielleicht geschwiegen. Lügen werde ich nicht. ... Gewissheit musste ich erlangen, und die Wahrheit musste ich sagen, wenn ich überhaupt sprach." (II, 496-497) However, only Ell's magnanimous decision saved Torm from prosecution and another separation from his wife.

Therefore, Hugo Torm is shown as emotional (mostly because of his jealousy toward Ell), proud and honest--qualities that also belong to Ell and Saltner and do not give him a distinct personality.

Saltner, the zoologist of the expedition, has a more impulsive character than either Torm or Grunthe. After having read an article on how much tax Mars could squeeze out of Earth, Saltner burst out in front of Ell: "Ich würde den ersten martischen Satrapen, der mir meine Million Kalorien abknöpfen wollte, mir doch erst ein wenig mit meinen Fäusten betrachten. ... Denn besser ist es, mit ein Bissel Repulsit ausgelöscht zu werden, als unter die Fremdherrschaft sich beugen, und wenn sie sich noch so sehr mit dem Namen der Freiheit ausstaffiert." (II, 109) He frankly told Ell who tried to show how much good the Nume could bring to the poor humans: "Ich glaub' nicht an die Freiheit, die nicht aus eigner Kraft kommt." (II, 110) These remarks (again missing in the English edition) point to an impetuous, honest and courageous character that he proved in his actions.

Later, Saltner experienced an even stronger feeling against Ell--jealousy because of La: "Er konnte es sich nicht verhehlen, er war eifersüchtig. ...sie zeigte ihm in jedem Augenblicke, wie wert er ihr war. Aber sie zeigte es auch Ell. Das störte ihn, das empörte ihn, sie aber fand es offenbar ganz in Ordnung. Sie war eine Martierin--sie hatte ihn ja gewarnt..." (II, 151)

He could not accept this aspect of Martian freedom: "...Deine Liebe teilen--mit jenem--das vermag ich nicht. Ich bin ein Mensch, und wenn Du ihn liebst, so muss ich scheiden." (II, 186)

Another trait that characterizes Saltner is his fast decision-making in dangerous moments. At one time he fled with his mother who had been put into a "Laboratorium" by the Kultor of that district--Oss (one of the Nume with Earth fever)--who tried to take revenge on Saltner for La's refusal to marry him. (II, 348-363) The other time Saltner forced a Kultor to leave La's airship so that his mother was again saved. (II, 460-462)

Altogether, then, Saltner is impulsive, frank, jealous and fast in making decisions.

In contrast to Isma, La is a decisive person: she solved her conflict through reason and action. Her love for Saltner and the concept of numedom seemed incompatible to her until she understood that she could only regain her dignity and freedom by following Saltner to Earth (as we have seen earlier). Patiently, she learned to live on this planet with its heavier gravity after her inventions of special diabaric hats and umbrellas. (II, 370-372) She even tried to love this young and wild planet on which she and Se were once caught in a violent thunderstorm, a phenomenon unknown on the old Mars. (II, 403-405) Se could only admire her friend, "die mutig und entschlossen den unerhörten Schritt vom Nu zur Erde wagen wollte" (II, 421) and who did not doubt that Saltner still loved her as he did two years back: "Glaubst Du, dass der vergessen kann, um den diese Augen aus Liebe weinten? Nein, ich bin La, ich bin seine La, und das denken wir beide zu jeder Stunde, denken's und fühlen's in tausend Schmerzen, und ob wir es uns auch niemals wieder sagen, wir zweifeln nicht." (II, 422)

When Saltner's mother was in danger of being arrested on La's airship and Saltner had to act very quickly against the Kultor (which was contrary to Nume laws), he told La: "Den Nu oder mich! Wenn der Mann nicht freiwillig geht, wirst Du wählen müssen." (II, 460) La proved her love for Saltner by choosing him. As a result, they had to flee to the United States where

she took the side of the humans:

> La bedauerte innig die Trübung der Beziehungen zwischen den Planeten, doch stand sie nicht bloss als Gattin ihres Mannes, sondern auch mit ihrem Gerechtigkeitsgefühl auf der Seite der Menschen, die für ihre Unabhängigkeit kämpften. Sie hörte nicht auf zu glauben, dass die Vernunft auf dem Mars siegen und zu einem heilsamen Frieden führen werde. (II, 525)

And only when she received news of this final peace did she feel completely happy: "La fiel ihrem Manne um den Hals. Thränen der Freude drängten sich in ihre Augen. ... Jetzt erst fand sie die volle Ruhe, nun war ihr Bund bestätigt vom Geschick der Planeten." (II, 544)

Se is hardly characterized at all. She is only shown as being very considerate towards friends. Like La, she was "bound" to Saltner in a free game of love and friendship. (I, 216) When Saltner--by accident--had watched secret tests on nihilit and Se found him in that forbidden area of Mars, she had no other choice but to let him escape if she did not want to kill her friend. (II, 182-183) But later Se broke off the liaison because she felt that La loved Saltner. (II, 375)

The last of the main characters is Grunthe, the astronomer, who stands by himself. He is supposed to represent a typical German man of science. When he regained consciousness on the North Pole island, he--unlike Saltner--studied his surroundings carefully, deducted from a painting that Martians had settled at the Pole and knew at once, from his movements, that he found himself in one third of Earth's normal gravity. (I, 88-93) Like a typical "Gelehrter" he felt uneasy in the company of women: "Diese Damengesellschaft war ihm schrecklich; lieber hätte er sich von feindlichen Wilden umgeben gesehen." (I, 94)

Everything is taken very seriously by Grunthe: duty comes first, personal inclination second. Grunthe believed that he and Saltner had not only the scientific obligation to announce the existence of the Martians to the nations of the world, but

also a political and cultural duty to do so (I, 258-260); the lighthearted Saltner had not even thought about these questions. And when Grunthe informed Torm about the bad situation on Earth, he admitted sadly that men did not really deserve a better fate:

> Es ist nicht der Verlust der politischen Macht für unser Vaterland, der mich am meisten schmerzt, so wehe er mir thut. ... Was mir unmöglich macht, ohne die tiefste Erregung von diesen Dingen zu reden, ist die demütige Ueberzeugung, dass wir es eigentlich nicht besser verdienen. Haben wir es verstanden, die Würde des Menschen zu wahren? ... O, das ist es ja eben, dass die Nume in allem vollständig Recht haben, was sie lehren und an uns verachten, und dass wir doch als Menschen es nicht von ihnen annehmen dürfen, weil wir nur frei werden können aus eigner Arbeit. Und so ist es unser tragisches Schicksal, dass wir uns auflehnen müssen gegen das Gute! Und es ist das tragische Geschick der Nume, dass sie um des Guten willen schlecht werden müssen! (II, 274-275)

This deep concern and his philosophy caused him to found the federation of humans under the motto: "Numenheit ohne Nume!" (II, 417) Grunthe, the analytical man of science with his Kantian concept of duty, is in fact more Nume-like than Ell, who knows passion.

We have seen that most of the main characters possess certain attributes and struggle with different inner conflicts, but they do not have distinct personalities. Rottensteiner criticizes the lack of characterization as well as the idealization of the protagonists:

> Die Rollen der einzelnen Charaktere sind vernünftig angelegt, Lasswitz vermeidet es, seinen Figuren die übertriebene Bedeutung zuzumessen, die für die mindere SF so charakteristisch ist. ... Die grösste Schwäche des Buches ist allerdings die Charakterisierung, die über das Niveau eines Romans in einer Sonntagszeitung nicht hinausreicht; nicht bloss die moralisch gewiss

> höherstehenden Marsianer, sondern auch die menschlichen Träger der Handlung sind so idealisiert, dass es schwerfällt, mit ihnen mitzufühlen. ...je vollkommener ein Charakter, desto langweiliger für den Leser. ... Der erzieherische Wert solcher Geschichten ist gering, weil ihr dramatischer Wert so gering ist. Sie belehren, aber sie erschüttern nicht... [29]

Lasswitz' idealization of the characters, then, springs from a philosophic concern and a didactic intent. The lack of dramatic effect in certain parts originates from his tendency to theorize; thus, his characters are mainly described through thoughts (that may extend over pages) rather than through actions. Lasswitz' Martians were supposed to be the vehicle for his Kantian idealism, but despite their humanoid form and senses they do not quite touch us and the message of the novel loses some of its impact. Similarly, the human characters are so sketchily drawn that they are hardly convincing.

Concerning the sentimentality of the novel Rottensteiner says: "Überhaupt war Lasswitz am erfolgreichsten, wo er satirisch und witzig ist; nur wenn er es ernst meint, ins Schwärmen verfällt, gerät ihm das Gefühl oft zur Sentimentalität." [30] We only have to recall some of the most disturbing examples concerning religion and love, to feel Lasswitz' awkwardness in this matter:

> Aus der Stille des Alls sprach die Stimme des einen Vaters zu seinen Kindern und füllte ihre Seelen mit andächtigem Vertrauen. (I, 232)
>
> In verzehrenden Flammen loderte in ihm [Ell] die Leidenschaft, sie zu besitzen. (II, 481)
>
> ...ich bin seine La, und das denken wir beide zu jeder Stunde, denken's und fühlen's in tausend Schmerzen... (II, 422)

Lasswitz, like most writers of his time, is very discreet about anything concerning sex. However, one very zealous critic, Manfred Nagl, searched long enough to be able to accuse Lasswitz of hidden eroticism:

> Die latente "erotische Betriebsamkeit" [a footnote refers to Horkheimer/Adorno], die an der Oberfläche

> eben jene Tabus strikt einhält, aus denen sie sich speist, entlädt sich in zufällig-situativen Verfänglichkeiten [reference to I, 98: due to a different gravity Grunthe falls into La's arms], geographischen Sexualsymbolismen [I, 144: a glacier chasm into which La fell] und in reizsteigernden spiritualisierenden Überhöhungen des Lustobjektes durch Marienattribute [I, 217: La's hair shimmered like a halo]. [31]

This comment and especially the second example are far-fetched for a person like Lasswitz whom Rottensteiner describes as "...ein biederer Schreiber, ordnungsliebend und gewissenhaft bis zur Pedanterie, brav und kaum viel mehr." [32]

The novel contains some weaknesses--the lack of characterization, the idealization of the protagonists and the sentimentality of certain passages--but let us not forget that there are many positive sides to Auf zwei Planeten. The vision of the planet Mars with its superior technological development and its higher ethical culture remains an achievement which Rottensteiner praises with these words: "Als Pionier der Science Fiction jedoch ist Lasswitz von bleibender Bedeutung; in Ländern wie den Vereinigten Staaten haben weitaus schlechtere Schriftsteller der Science Fiction ihre heutige Form gegeben." [33]

C. Conclusion

As we have seen, Auf zwei Planeten is a very long and complex work. Only five main points were treated in detail--the scientific and technological speculations, the planet Mars, the Martians with their Kantian ethics, the humans and the main characters--, so that a general evaluation of the novel is still necessary. This will be done in terms of the three elements of SF, of Lasswitz' own notions about "wissenschaftliche Märchen" and of the different kinds of SF that we mentioned in the history of SF. In addition, we will apply the critical standards of quality used by the different SF writers named earlier. And finally, a few comments will be made on the English translation which is based on Erich Lasswitz' abridged edition of 1948.

All three elements of SF can be found in Lasswitz' novel. The element of science is of great importance since the intellectual and ethical improvement of the future society is based on it. The sense of wonder is mostly present in the first two parts of the novel and is described by Bölsche as follows:

> ...man fühlt in allem Phantasienebel etwas, was Verne niemals hat. Es weht den Leser ein Hauch des Grandiosen, ethisch Befreiten von diesen Menschen "auf zwei Planeten" an,--wirklich etwas von jener tiefen Ahnung, die seit Jahrtausenden durch die Völker geht: dass im höchsten Chaos aller Erdendinge, wenn das Edle in den Kot getreten liegt und der Unsinn triumphiert, dass dann aus dem Geheimnis des Kosmos heraus ein Fremdes, Ungeheuerliches, Strahlendes auf diesen schmutzigen Planeten niedersteigen werde. Wie die Mexikaner einst von Quetzalquatel träumten, dass er von Osten kommen werde, in einem goldenen Morgen, weisse Männer mit

> übernatürlich grossen, vergeistigten Augen. Wie es in den alten Sagen des Orients klingt: von weisen Fischmenschen, die aus dem Blau des Unbekannten stiegen und die Völker lehrten. Unseren Tagen wird die Mystik eng.[1]

The third element is the factor of change for which Lundwall praised SF as being unique. Lasswitz speculated about the possible changes that science and technology may one day have on man and his ethics.

Because of these ideas Lasswitz belongs to the group of those writers who try to bridge the gap between the two cultures. Like Franke today, Lasswitz pointed to this gap in connection with the traditional system of education. However, Lasswitz avoided blaming anyone in particular; he simply noticed that the field of art concerned with technology "...ist erst sehr wenig bearbeitet, weil infolge unseres traditionellen Bildungsganges dem Publikum die naturwissenschaftlichen Grundlagen fehlen. Auch mag den dichterischen Kräften die wissenschaftliche Ausrüstung, oder den wissenschaftlich Geschulten die dichterische Kraft mangeln. Ich hüte mich, darüber zu urtheilen." (Z 481-482) Bölsche, in fact, insists that Lasswitz' novel did not have the success it should have had exactly because of the general lack of scientific education.[2] Ironically enough, Lasswitz himself displays more scientific knowledge than literary training in Auf zwei Planeten.

Another look at the "first explicit justification for science fiction" which we find in "Ueber Zukunftsträume" will deepen our comprehension of Lasswitz' intentions and notions concerning "das wissenschaftliche Märchen:"

> ... Es gilt, das neue Naturgefühl persönlich zu gestalten. .... Und darin eröffnet sich ein ungeheures Feld für das wissenschaftliche Märchen, eine echt künstlerische Aufgabe,...vor unseren Augen eine neue und höhere Welt entstehen zu lassen. ... Hier liegen überall Probleme für den Dichter, das rein Menschliche in seiner Berührung mit den Formen gezügelter Natur auch neu zu beleuchten... Die Phantasie braucht aber

> keine ungezügelte zu sein, sie kann sich ihr Gesetz durch Vernunft geben, dann wird sie Kunst. ... Und so sind mir erträumte technische Fortschritte der Zukunft ein unendliches Gebiet, reine ästhetische Freude zu geniessen in dem Bewusstsein, dass die ewige Freiheit der Vernunft siegreich schreitet über den Zwang der Natur... (Z 482, 481, 483)

Did Lasswitz apply these ideas of SF to his own major work? He certainly tried to show us a new and higher world in which the homo futurus (i.e. the idealized Nume) has a new feeling toward nature because he has subdued it. His imagination stayed within reasonable bounds--especially in his scientific speculations--but he was probably too optimistic concerning science and man. No doubt, he felt an aesthetic pleasure while writing "reasonably" about reason--but so much reason is hardly down-to-earth, as we have seen in relation to his idealized characters.

However, Lasswitz uses again one word for two different things. For him the term "wissenschaftliches Märchen" refers to a story or novel based on scientific fact, while the same noun without the adjective means the contrary, as we can see in "Unser Recht auf Bewohner anderer Welten." After explaining that extraterrestrials have to be humanoid for aesthetic reasons, Lasswitz writes: "Für die Vorgänge in derartig fremden Organismen /Bazillen etc./ vermögen wir kein Interesse zu gewinnen, es sei denn, dass wir diese einfach willkürlich wieder zu Menschen machen. Dann aber sind wir im Märchen oder in der Groteske, und von diesen Kunstformen ist hier nicht die Rede." (EE 169) /my underlining/ Besides this, he calls Seifenblasen "moderne Märchen"--a subtitle which one expects to refer to science--even if some of the stories are nothing but a play of fantasy. "Zukunftsträume" have to do with "Verbesserung menschlicher Zustände mit Hilfe des Fortschritts der Naturerkenntniss und der technischen Kultur" and are "wissenschaftliche Märchen." (Z 481-482) Thus, Lasswitz had some difficulty in separating fantasy from SF but he enjoyed writing both (like some of today's SF writers).

Is his novel, then, pure fantasy, i.e. "imaginary-and-not-

possible," as Heinlein defines this branch of literature? [3] No, because many of the speculations are based on scientific possibility. Lasswitz' Mars is not pure invention but built on the knowledge of his time. If there had really been artificial canals on Mars, some of his deductions might have been possible. He certainly used a great amount of imagination in order to surround the nucleus of contemporary knowledge with many ingenious and sometimes amusing details--technological gadgets, different Mars plants and animals, or unexpected reactions of one planetary race toward another. Lasswitz' intent was not simply to tell a fairy tale; he wanted to communicate a certain message concerning the future of mankind.

Technology plays an important role in Auf zwei Planeten but is not exaggerated, as in science fiction where the machine rules supreme. In Lasswitz' case, technology serves society. Did he then write social SF? He is "concerned with the impact of scientific advance upon human beings"--to use Asimov's definition. [4] Yet, Asimov's example of an imaginary vehicle--with social SF finding a solution to the problems resulting from its invention [5]--indicates that Lasswitz saw exclusively the positive side of technology, so that his novel is only partly social SF.

The novel contains nothing but elements of the different kinds of SF: technological gadgets, some social ideas, adventures of the main characters, anti-utopian ideas when the superior race becomes barbarized through the contact with the humans, critical comments about some human weaknesses, and the setting of part of the novel on another world; thus, Auf zwei Planeten is neither pure science fiction, social SF, space opera, anti-utopia, social criticism nor space fiction.

For a long time it was considered a "technological utopia" (cf. Kretzmann's article) which is an inaccurate designation since this novel is not a utopia, i.e. "an impossible dream of an ideal state." [6] Defending himself against "technischen Chiliasmus," Lasswitz explains that a "Zukunftsphantasie der Vollkommenheit" would be absurd, since "Streben nach Verbesserung" is vital for man. (Z 466)

Krysmanski calls Lasswitz an "'unterhaltender' technischer Utopist" (this author certainly did more than just entertain!) and he does not really include Lasswitz' work in SF, since he considers SF a "spezifisch amerikanisches Phänomen, dem wir in Deutschland als einen seiner Vorläufer nur Kurd Lasswitz entgegenzusetzen haben." [7] Krysmanski writes about the novel: "In ihm ist die Fülle wissenschaftlicher und technischer Möglichkeiten ausgesponnen, die heute, zwar auf den neuesten Stand gebracht, noch immer zu den Requisiten jedes Science Fiction Autors gehören: Raumschiffe, künstliche Schwerefelder, Strahlenwaffen, Bewohner fremder Planeten etc." [8]

Auf zwei Planeten is concerned with "a human problem, and a human solution, which would not have happened at all without its science content," and since this is a definition of SF on which there is wide agreement, [9] Lasswitz' novel can be considered SF. For convenience's sake, his work may be included in a new kind of SF that could be called philosophical or idealistic SF because of the special ethical concern.

If we apply today's values of good or bad SF to this novel, we will arrive at positive as well as negative points. Knight's proposed "ordinary critical standards" (originality, sincerity, style, construction, logic etc.) [10] show that Auf zwei Planeten is quite original in that it combines philosophy with SF or ethics with science and technology. Rottensteiner admits: "Beachtenswerter noch als /die/ technischen Wunder...sind die sittlichen Errungenschaften der Marsianer, die noch heute ohne Parallele dastehen." [11] The novel can be considered to be a sincere work--Lasswitz honestly tried to grasp the world with which he was faced; he proposed solutions for a better future, without forgetting that a perfect state of affairs is neither possible nor desirable, because man needs the vital stimulus of dissatisfaction and hope. However, Lasswitz' concern with Kantian ethics is so deep that some passages become annoyingly didactic and repetitious, since too much theory interrupts the plot. There are long passages about certain technological inventions and about philosophical ideas. Some parts are quite

sentimental, but a philosopher who bathes mentally in reason may simply not be able to express feelings well. The novel is well constructed, although the third part is disappointing after the strong sense of wonder in the first two parts, and the ending is not very convincing.

Heinlein requires for good SF "extensive scientific training and intensive literary training." [12] Lasswitz had more of the former. Certainly, this early work of SF is significant in the sense that it denies the gap between the two cultures and shows scientific knowledge as well as some responsible social imagination (Suvin). [13] According to Wollheim's definition of SF, [14] Lasswitz' work would not be quite "mature:" it does contain imaginary voyages, future predictions and remarkable inventions, but the social satire is not very successful--as Bölsche remarks: "...der satirische Zweck /ist/ viel zu klein für den riesigen Hintergrund der zwei Planeten." [15] However, the novel can be considered good SF in Atheling's sense, [16] for it clearly depends upon science.

To conclude, let us take a short glance at the English translation. Auf zwei Planeten--which had been such a success in Europe that it was translated into many languages at the turn of the century--was not translated into English until 1971. Pierre Versins writes about this translation: "...il existe désormais une traduction anglaise du chef-d'oeuvre de LASSWITZ... faite malheureusement d'après la réédition allemande de 1948. Le traducteur, toutefois, a restitué certains passages de l'édition originale..." [17] /my underlining/ The abridged edition of 1948 was published by Erich Lasswitz (1880-1959) in honor of his father's 100th birthday and because all of Lasswitz' books had been banned in 1933. As Rottensteiner says: "...speziell das 'neue' Deutschland...hatte wenig Verwendung für seine /Lasswitz/ pazifistische und pluralistische Botschaft, für seine Toleranz und seine Kulturideale." [18] The son believes to have had the necessary "Einfühlungsvermögen, Takt, Pietät" to shorten the novel drastically (from 966 pages to 316!), "wegen der Papiernot," but in at least one point the son's comprehension of

his father's work is questionable: when Erich Lasswitz writes in the preface that the "Überholtheit mancher wissenschaftlicher Theoreme.../den Roman/ dadurch erst recht in die Märchenhaftigkeit einer echten Utopie entrückt..." [19] We have seen that the father neither intended to write a simple "Märchen" nor a utopia.

It would go too far to list all the passages which Erich Lasswitz omitted and those which the English translator added. Let us just point out a few passages, most of which have already been mentioned as missing in the English translation: details about the psychophysical "Laboratorium," the historical periods on Mars, the little horse with wings, Isma's inner conflicts, Saltner's outburst and thoughts of Ell about his feelings toward the Bate (I, 75 vs. E 193). Chapter 33 on "Ideale" (into which Kurd Lasswitz put many of his own convictions about passion, reason, culture and freedom) was reduced from 13 to 2 1/2 pages; [20] the entire report "das Unglück vom 30. Mai" (II, 278-286) about the submission of Germany through the Martian magnetic disarming machine is missing, etc.

Generally speaking, the English translation has kept nearly all technological inventions, but shortened or omitted philosophical concepts as well as thoughts and comments made by the characters. Some of the cuts omit important notions, a few are unnecessary and others produce abrupt transitions in the text, while some are in fact good because the novel was written in a somewhat wordy style and a slowly moving plot. In addition to this, some of the chapters have been better arranged. Yet, on the whole, it seems that Erich Lasswitz did not do justice to his father's work by reediting the novel in a shortened form--which in turn served as a basis for the English translation. [21]

III. SUMMARY

This study has attempted to provide a mainly thematic analysis of an early work of German SF, the novel Auf zwei Planeten by Kurd Lasswitz.

SF is a relatively new literary genre that constitutes a response to the technological advances made since the Industrial Revolution. The three elements of SF--science, the sense of wonder and the notion of change--, the attempt to bridge the gap between science and humanities, the unique interaction between SF writers, fans and editors as well as certain standards of quality of different SF writers characterize this genre better than any of the innumerable definitions of SF.

The history of SF started with the advent of the machine around 1850 and not with Ezekiel, Plato, Dante or Swift. Their works may contain science fictional elements, but they have to be differentiated from SF because of three factors important to this genre: plausibility, the divergent intent and the technological development.

Mary Shelley and Edgar Allan Poe belong rather to fantasy than to SF. Verne and Wells, the two fathers of SF, represent the two poles of this field: Verne's work is characterized by optimism and an emphasis on adventures, while Wells was concerned with the dangerous effects of science and technology. Lasswitz adds another dimension to SF: the philosophic concern.

In the United States, Gernsback--who probably derived many of his scientific ideas from Lasswitz--was the active initiator of SF. He started the first seven SF magazines but unfortunately emphasized scientific fact over literary and human concern.

His science fiction (or gadget SF) lived through the pulp era, next to fantasy and space opera (which constitute adjacent

fields since both are not based on plausibility). Social SF was created by Campbell who also insisted on scientific fact but as a background to social and human problems. His decade (the forties) is often referred to as the "classic era" of SF.

Three events undoubtedly popularized SF--Orson Welles' radio broadcast of the Martian invasion (1938), the first World Convention of SF fandom in 1939 and Cartmill's book on the atomic bomb (Deadline, 1944)--so that SF emerged as a literary genre to be taken seriously despite its beginnings in the pulp magazines.

After the explosion of the Bomb, the optimistic belief in science was shaken, and the period of social criticism started around 1950 with two new magazines: Galaxy and Fantasy and Science Fiction. Following Hillegas, dystopia, the post-catastrophe novel and space fiction have the best potentiality for criticism.

A recent movement that originated in England is the New Wave. Its advocates can hardly be considered "universe makers" because of their defeatism and fear of change.

Today, all these different directions still exist in SF--with groups of optimistic Vernians, pessimistic Wellsians, horror-lovers à la Poe, science supporters, space opera fans, social critics and New Wave adherents--each claiming to be the most characteristic group or the most significant one.

SF, which started out in Europe, has mostly become an American phenomenon, typical for a country lacking a usable past, obsessed with dreams of utopia and searching for a new frontier (Ketterer). [1] There also exist important British writers (like Wells, Doyle, Stapledon, Huxley, Orwell and Clarke), while France has had few significant authors after Verne, and the same applies to Germany after Lasswitz, so that at present Anglo-American SF "does indeed dominate the Western World." [2]

Somewhere "out there" man may be bound to meet intelligent extraterrestrials--this is a preferred theme of SF and not a new idea in human history. Kurd Lasswitz used it in his novel Auf zwei Planeten which he based on the current speculations about Mars and the Martians as well as on the main ideas of Kant,

Schiller, Goethe and Fechner.

Many of Lasswitz' scientific and philosophical ideas appear in other of his works, especially in Bilder aus der Zukunft in which we already find the notion of artificial food, some fascinating speculations about psychophysics--that he did not use again to such extent--and the conflict between reason and emotion "Apoikis," describing a society based on Kantian principles, is "the Utopia of a university professor," [3] a kind of extension of the Martian States. His essay "Ueber Zukunftsträume" somewhat summarizes the main ideas of the novel and includes the first justification of SF. As we have seen, Lasswitz never quite stopped dreaming or thinking about Mars; during the last year of his life he wrote the fairy tale "Die entflohene Blume" as well as two essays defending the right to believe in extraterrestrials and in a populated Mars.

The analysis of Auf zwei Planeten has illustrated the complexity of this novel. The numerous scientific and technological speculations are indicative of Lasswitz' astonishing power of extrapolation and imagination (some of them have not been realized yet, in spite of their being technologically feasible). Lasswitz probably had an indirect influence on SF through Gernsback and a direct impact on astronautical thinking. His optimistic belief in science and technology can be explained by the fact that he was living in a country which "welcomed technological developments with unbounded enthusiasm." [4] However, Lasswitz was not a fanatic who used science as an end in itself, but as a means toward cultural progress.

It is precisely because of the progress in science and technology that the Martians can claim superior forms of urban planning and economics, social and political freedom (based on Kantian principles) and new kinds of art. Only religion seems to have remained static.

The Nume, resembling the humans in outer appearance, have superior intelligence and higher ethics. They believe that education is the key to happiness and peace since it provides the knowledge necessary to subdue nature through technology and to overcome desires in order to attain the higher goal of freedom.

Yet, the Martians show a certain haughtiness toward the humans, and many of them become "barbarized" in their contact with the Bate. Since Lasswitz uses his Nume as an ethical paragon, their behavioral change is puzzling and anticlimactic; they have become victims of his desire for contemporary satire that permeates the third part of the novel.

The humans--with the exception of the main characters--are usually depicted as savages who have a bad moral influence on the Nume. Although the Germans are sometimes described more positively than the English, Lasswitz cannot be accused of nationalism; his concern is for mankind as a whole. His imperialistic Martians are not a "glorified German race" [5] but rather support his critique of colonialism.

The main characters do not have distinct personalities. They are too idealized and therefore hardly convincing. Some highly sentimental passages which show Lasswitz' inability to express feelings are another weakness of the novel.

Auf zwei Planeten contains all three elements of SF--science, sense of wonder and change--and stands as an example for bridging the gap between science and the humanities. It contains elements of many different kinds of SF, but since technology serves ethical purposes it can be considered a work of philosophical or more specifically idealistic SF.

In spite of several deficiencies, the novel is still worth reading. Lasswitz may be criticized for his optimistic belief in man and science, for his lack of characterization, for his idealization of the characters, didacticism and sentimentality--but there remains "an ultimately valid core to his vision." [6] The main theme of the novel--science and technology can be a means for the ethical improvement of humanity--constitutes a fascinating and original idea, so that Lasswitz is not only "a German pioneer of science fiction" [7] but also a pioneer of philosophical SF. It is regrettable that his major contribution, his ethical ideas, had so little influence on this genre. Here still lies an open field, worthwhile exploring for writers with a philosophical penchant. Lasswitz' justification for his

"dreams of the future" may remind us of the importance of this relatively new literary genre: "...was gibt es denn menschlich Bedeutungsvolleres als die Zukunft der Menschheit?" (Z. 482)

FOOTNOTES

I. AN INTRODUCTION TO SCIENCE FICTION

A. A New Literary Genre

1 Kingsley Amis, New Maps of Hell: A Survey of Science Fiction (New York, 1960), p. 9.

2 Isaac Asimov, "Social Science Fiction," in: Modern Science Fiction: Its Meaning and Its Future, ed. Reginald Bretnor (New York, 1953), p. 167.

3 Quoted by James Blish, "On Science Fiction Criticism," in: SF: The Other Side of Realism, ed. Thomas D. Clareson (Bowling Green, Ohio, 1971), p. 167.

4 John W. Campbell, Jr., "The Place of Science," in: Bretnor, pp. 4-6.

5 William Atheling, Jr., More Issues at Hand (Chicago, 1970), pp. 47-49.

6 Cyril M. Kornbluth, "The Failure of the Science Fiction Novel as Social Criticism," in: Davenport, p. 65.

7 Campbell, in: Bretnor, pp. 12-13.

8 Sam J. Lundwall, Science Fiction: What It's All About (New York, 1971), p. 140.

9 Campbell, in: Bretnor, pp. 11-13.

10 Lundwall, p. 227.

11 Damon Knight, In Search of Wonder: Essays on Modern Science Fiction (Chicago, 1967[2], rev. ed.), p. 1.

12 Ibid., p. 32.

13 Robert A. Heinlein, "Science Fiction: Its Nature, Faults and Virtues," in: The Science Fiction Novel: Imagination and Social Criticism, ed. Basil Davenport (Chicago, 1969[3],

unrev. ed. of 1959), pp. 35-36.

14 Lundwall, p. 124.

15 cf. Darko Suvin, "Zur Poetik des literarischen Genres Science Fiction," in: Science Fiction: Theorie und Geschichte, ed. Eike Barmeyer (München, 1972), p. 103.

16 cf. Donald A. Wollheim, The Universe Makers: Science Fiction Today (New York, 1971), pp. 16-18.

17 Atheling, p. 118.

18 Lundwall, p. 25.

19 Quoted in: Atheling, p. 120.

20 Heinlein, in: Davenport, p. 38.

21 Knight, pp. 1-2.

22 Herbert W. Franke, "Literatur der technischen Welt," in: Barmeyer, pp. 108-109, cf. also pp. 117-118.

23 Ibid., p. 114.

B. The History of Science Fiction

1 Jean Gattégno, La science-fiction (Paris, 1971), p. 7.

2 Lundwall, p. 27.

3 Sam Moskowitz, Explorers of the Infinite: Shapers of Science Fiction (Cleveland and New York, 1963, unrev. ed. of 1957), pp. 11, 12, 19.

4 Gattégno, p. 10.

5 Asimov, in: Bretnor, pp. 160, 167.

6 For example, Clarke may look at old space travel stories (by Lucian, Kepler, Godwin etc.) from a scientific point of view as a "Preparation for the Age of Space" as long as he does not annex them into SF. cf. Arthur C. Clarke, "Science Fiction: Preparation for the Age of Space," in: Bretnor, pp. 197-220.

7 Brian Aldiss, Billion Year Spree: The History of Science Fiction (London, 1975), p. 3.

8 Ibid., pp. 32-33, 29.

9 Mary Shelley, Frankenstein: or, The Modern Prometheus

(New York, 1963), "Preface" p. 12, "Introduction" p. 16.

10 Aldiss, p. 20.

11 Amis, p. 34.

12 Ibid.

13 Moskowitz, p. 47.

14 David Ketterer, New Worlds for Old: The Apocalyptic Imagination, Science Fiction, and American Literature (Garden City, New York, 1974), p. 52.

15 Lundwall, p. 93.

16 Moskowitz, p. 76.

17 Wilhelm Bölsche, "Das Märchen des Mars," in: Vom Bazillus zum Affenmenschen: Naturwissenschaftliche Plaudereien (Jena, 1906[4]), pp. 304-306.

18 Jacques Sadoul, Histoire de la science-fiction moderne (1911-1971) (Paris, 1973), p. 18.

19 Amis, p. 34.

20 Wollheim, pp. 19, 21.

21 Ibid., p. 21.

22 Ibid., p. 19.

23 Amis, p. 38.

24 Quoted in: Lundwall, p. 37.

25 cf. Franz Rottensteiner, "Kurd Lasswitz: A German Pioneer of Science Fiction," in: Clareson, pp. 289-306.

26 Franz Rottensteiner, "Ordnungsliebend im Weltraum: Kurd Lasswitz," in: Polaris 1: Ein Science Fiction Almanach, ed. Rottensteiner (Frankfurt, 1973), p. 133. -- This article is more recent than the one in Clareson, longer and more critical of Lasswitz.

27 cf. Ketterer, p. 23.

28 cf. Moskowitz, p. 241.

29 Ibid., p. 322. -- In a chapter entitled "How Science Fiction Got Its Name," Moskowitz describes in detail when and where which term was used for this new kind of fiction: from "voyages extraordinaires" (for Verne's books) or "scientific fantasies" (for Wells' writings) via names like "off-trail stories," "different stories," "impossible stories" and "pseudo-scientific stories" to Gernsback's terms

"scientific fiction," "scientifiction" and finally "science fiction." cf. pp. 313-333.

30 Ibid., p. 225.

31 Aldiss, p. 239.

32 Asimov, in: Bretnor, p. 171.

33 Lin Carter, Imaginary Worlds: The Art of Fantasy (New York, 1973), p. 77.

34 Knight, pp. 117-118.

35 Carter, p. 145.

36 Ibid., p. 158.

37 Atheling, pp. 94, 106-107, 99.

38 Ibid., p. 105.

39 Lundwall, pp. 114-115, 120.

40 cf. Amis, pp. 22-23.

41 Ibid., p. 45. -- Suvin sees a relationship between space opera and fairy tale and places space opera "in das bedrükkende Grenzgebiet zwischen minderer SF und Nicht-SF." cf. Suvin, in: Barmeyer, pp. 90, 97.

42 Amis, p. 43.

43 Lundwall, p. 118.

44 Asimov, in: Bretnor, p. 171.

45 Wollheim, p. 76. -- However, Campbell is dead by now; he died in 1971.

46 Atheling, p. 92.

47 cf. Sadoul, pp. 135-136.

48 Aldiss, p. 264.

49 cf. Sadoul, pp. 135-136.

50 Ibid., p. 132.

51 Ibid., pp. 148-149.

52 Wollheim, p. 16. -- Vera Graaf--in her book Homo Futurus: Eine Analyse der modernen Science-fiction (Hamburg, 1971)--makes an interesting remark about this construction of a whole "Science-fiction-Gedankengebäude" (taking as an example Asimov's Three Laws of Robotics which have been used and modified by many other authors) by contrasting science with fiction: "Dieses Zusammentragen von Partikel um Partikel zu einem Ganzen scheint eher der naturwissenschaft-

lichen Arbeitsweise verwandt zu sein als dem literarischen Schaffen, das den individuellen und subjektiven Beitrag des Autors in den Vordergrund stellt." (p. 36)

53 Mark R. Hillegas, "Science Fiction as a Cultural Phenomenon: A Re-evaluation," in: Clareson, pp. 275-276.

54 Kornbluth, in: Davenport, p. 55.

55 Basil Davenport, "Introduction," in: Davenport, p. 11.

56 Atheling, p. 123.

57 Wollheim, p. 105.

58 Lundwall, p. 140.

59 The "air-conditioned nightmares" are taken from Lundwall, p. 58; the "new maps of hell" refer to Amis' book with the same title.

60 Donald A. Wollheim, "Introduction," in: Lundwall, p. 8.

61 Sadoul, p. 310.

62 Ibid., pp. 341, 383.

63 Hans-Jürgen Krysmanski, Die utopische Methode: Eine literatur- und wissenssoziologische Untersuchung deutscher utopischer Romane des 20. Jahrhunderts (Köln und Opladen, 1963), p. 35.

64 Ibid., p. 85.

65 Rottensteiner, in: Polaris 1, p. 162. -- Rottensteiner, an Austrian, is editor of the Quarber Merkur magazine with which he tries to improve the SF situation in German speaking countries. The motto of his magazine is: "Kampf der verderblichen Schundliteratur."

66 Lundwall, pp. 212-213. -- Some German leftist critics attack German SF even more violently, especially its most propagated form, the Perry Rhodan magazines. Ronald M. Hahn --in his article "Wissenschaft & Technik = Zukunft," in: Barmeyer--complains: "...diese Massenliteratur ist zu einem Tummelplatz der Reaktion geworden, auf dem der militärisch-politische Terror der Herrschenden seine legitime Fortsetzung findet." (pp. 219-220) Very similar and polemic notions are expressed by Michael Pehlke und Norbert Lingfeld in their book Roboter und Gartenlaube: Ideologie und Unterhaltung in der Science-Fiction-Literatur (München, 1970),

cf. pp. 14, 19-21.

67 cf. Other Worlds, Other Seas, ed. Darko Suvin (New York, 1970), an anthology in which Suvin refers to the Polish author Stanislaw Lem as "the most significant European SF writer today." (p. 30)

II. KURD LASSWITZ' NOVEL AUF ZWEI PLANETEN

A. Introduction

1 Quoted in: Iosef S. Shklovskii and Carl Sagan, Intelligent Life in the Universe (New York, 1966), p. 3.

2 Ibid., pp. 3, 6, 19.

3 cf. Erich von Däniken, Erinnerungen an die Zukunft (München, 1968), pp. 25-26, 91-93; also: Meine Welt in Bildern (München, 1975), pp. 199, 117-119.

4 cf. Arthur C. Clarke, Report on Planet Three and Other Speculations (London, 1975^{2}), p. 245.

5 Ibid., pp. 245, 101.

6 Ibid., p. 84

7 Ibid., pp. 231, 233.

8 Wollheim, p. 111.

9 Ibid., pp. 111-116.

10 Clarke, p. 196.

11 Willy Ley, Rockets, Missiles and Men in Space (New York, 1968), pp. 33-34.

12 Ibid., p. 35. -- Karl Debus--in his article "Weltraumschiffahrt, ein poetischer Traum und ein technisches Problem der Zeit," in: Hochland (Kempten, 1927), Nr. 10--speaks of a "Marspsychose" mentioning among other things the construction of a huge radio in England in 1925 for the purpose of communicating with Mars, the sending of telegrams to Mars during the opposition of the two planets in 1926, and the discovery of the Martian language during sessions of occult-

ists! (cf. pp. 357-358)

13 Ley, p. 40.

14 Ibid.

15 Ibid.

16 Ibid., pp. 40-41.

17 Percival Lowell, Mars (Boston and New York, 1895), preface, p. V.

18 Dates on Lasswitz cf. Ley, p. 42.

19 Rottensteiner, in: Polaris 1, p. 138.

20 The parenthetical references with L on the next two pages apply to Lowell's Mars.

21 Shklovskii and Sagan, p. 266.

22 Ibid., pp. 273-275.

23 Ibid., p. 262.

24 All the following parenthetical references to the novel apply to this edition: Kurd Lasswitz, Auf zwei Planeten (Leipzig, n. d.), 2 vols. The Roman numeral stands for the respective volume.

25 Shklovskii and Sagan, p. 276.

26 Ibid., pp. 276-278.

27 Ibid., pp. 373-374.

28 Ibid., p. 21.

29 Ley, p. 42.

30 cf. Rottensteiner, in: Polaris 1, p. 141.

31 W/alther/ Lietzmann, "Zur Einführung," in: Kurd Lasswitz, Die Welt und der Mathematikus, ed. W. Lietzmann (Leipzig, Berlin, 1924), pp. 4-5.

32 cf. Kurd Lasswitz, "Selbstbiographische Studien," in: Seifenblasen: Moderne Märchen (Berlin, 1901[3]), pp. 274-288.

33 A list of all of Lasswitz' works can be found at the end of this thesis.

34 cf. Kurd Lasswitz, "Humor und Glauben bei Gustav Theodor Fechner (Dr. Mises)" (1893), in: Empfundenes und Erkanntes, ed. Hans Lindau (Leipzig, n. d.), p. 208.

35 Ibid., pp. 211-213.

36 cf. Raimund Pissin, "Kurd Lasswitz," in: Die Nation (Berlin, 3. Dez. 1904), Nr. 10, p. 153.

37 Quoted in: Hans Lindau, "Kurd Lasswitz," in: Kurd Lasswitz, Empfundenes und Erkanntes, pp. 53-55.

38 Rottensteiner, in: Polaris 1, p. 148.

39 All parenthetical references with B apply to: Kurd Lasswitz, Bilder aus der Zukunft (Fürth, 1964). The Roman numeral stands for the respective story. This edition is a "Nachdruck nach der im Verlag von S. Schottlaender in Breslau im Jahre 1879 erschienenen dritten Auflage" and contains unfortunately many typing errors. -- s.a. P.S. p.111 of thesis

40 Rottensteiner, in: Polaris 1, p. 146.

41 Auf zwei Planeten contains only one sentence in which a computer is described as "Apparat, der nichts anderes vorstellte, als eine Maschine zur Ausführung schwieriger mathematischer Rechnungen." (I, 59) According to Ley, the idea of the computer goes back to the Spanish mathematician Raimundus Lullus (1235-1315). cf. Rottensteiner, in: Polaris 1, p. 164, footnote 15.

42 Ibid., pp. 148-149.

43 Moskowitz, p. 232.

44 Heinlein, in: Davenport, pp. 24-25.

45 Ibid., p. 24. -- Blish arrives at the same conclusion in his article "Nachruf auf die Prophetie," in: Barmeyer, pp. 118-128.

46 The parenthetical references with S apply to "Apoikis," in: Seifenblasen.

47 Edwin M. J. Kretzmann, "German Technological Utopias of the Pre-War Period," in: Annals of Science (London, Oct. 15, 1938), vol. 3, no. 4, p. 423, incl. footnote 21.

48 Ketterer, p. 98.

49 All parenthetical references with Z apply to: Kurd Lasswitz, "Ueber Zukunftsträume," in: Die Nation (Berlin, 13. und 20. Mai 1899), Nr. 33 und 34.

50 Rottensteiner, in: Polaris 1, p. 159.

51 All parenthetical references with EE apply to Empfundenes und Erkanntes.

52 Throughout this study the original German terms are used, i.e. Bate, Antibaten and Philobaten (despite Lasswitz'

inconsistency with the -n in contrast to Bate without -n), instead of the terms used in the English translation, Bati, Anti-Bati and Philobati.

B. Analysis of the Novel

1 Rottensteiner, in: Polaris 1, pp. 137-138.

2 Arthur C. Clarke, The Making of a Moon: The Story of the Earth Satellite Program (New York, 1957), p. 30.

3 cf. Clarke, Report on Planet Three, pp. 53, 55, 61, 62.

4 Clarke, The Making of a Moon, p. 190.

5 cf. Davis Thomas, ed., Moon: Man's Greatest Adventure (New York, n. d.), p. 263.

6 Personal information from Dipl. Ing. Walter Kik, Institut für Luft- und Raumfahrt, Technische Universität Berlin.

7 Ibid.

8 Moskowitz, p. 27.

9 Clarke, Report on Planet Three, pp. 143-144.

10 All the following parenthetical references with E apply to the English translation of the novel: Kurd Lasswitz, Two Planets, abridged by Erich Lasswitz, translated by Hans H. Rudnick (New York, 1971).

11 Clarke, Report on Planet Three, pp. 153-154.

12 Ibid., pp. 139, 141.

13 cf. Isaac Asimov, Asimov's Guide to Science (New York, 1972), pp. 347, 411.

14 Ibid., pp. 411-412.

15 Moskowitz, p. 233.

16 Ibid., p. 99

17 Ley, p. 136. -- Lasswitz, however, used only the term "Repulsit," not "Repulsor." As Debus indicates, the rocket is an old invention that was probably already known by the Chinese around 3000 B.C. and was mentioned by Newton as a technical possibility for traveling through space. (cf. p. 367)

18 Anonymous, "Der technische Chiliasmus in der neueren Dichtung," in: Quarber Merkur 14 (Dezember 1967), 5. Jg., Nr. 4, pp. 7-8, 3-4; reprinted from: Grenzboten (1898), 57. Jg., 3. Vierteljahr, pp. 499 ff.

19 "Elefantentigerziegendrache," in: Die Welt (18. Nov. 1975), Nr. 269, p. 20.

20 C. L. Sulzberger, "This Is The World That Is," in: The New York Times (New York, July 14, 1974), section 4, p. 17.

21 Ketterer, p. 98.

22 Fredrick Copleston, S. J., A History of Philosophy (Garden City, New York, 1965), vol. 6, pp. 121-122. -- Hillegas made the observation that the word Nume is "quite possibly related to the word noumenon." (E 379) According to Kant, the noumenon is "an object of a non-sensuous intuition," i.e. "the noumenon is conceived as an intelligibile, a positive reality which could be the object of an intellectual intuition." (Copleston, vol. 6, pp. 63, 62.)

23 Clarke, Report on Planet Three, p. 143.

24 Bölsche, pp. 317-319.

25 Rottensteiner, in: Polaris 1, p. 161.

26 Kretzmann, p. 427.

27 Anonymous, p. 9.

28 Ibid., p. 8.

29 Rottensteiner, in: Polaris 1, pp. 136-137, 162.

30 Ibid., p. 152.

31 Manfred Nagl, Science Fiction in Deutschland (Tübingen, 1972), p. 86.

32 Rottensteiner, in: Polaris 1, p. 162.

33 Ibid.

C. Conclusion

1 Bölsche, p. 315.

2 Ibid., pp. 319-320.

3 Heinlein, in: Davenport, p. 18.

4 Asimov, in: Bretnor, p. 158.

5 Ibid., pp. 171-172:

> Let us suppose it is 1880 and we have a series of three writers who are each interested in writing a story of the future about an imaginary vehicle that can move without horses by some internal source of power; a horseless carriage, in other words. We might even make up a word and call it an automobile.
>
> ... [Writer X writes gadget SF and Y adventure SF.]
>
> Writer Z has the automobile already perfected. A society exists in which it is already a problem. Because of the automobile, a gigantic oil industry has grown up, highways have been paved across the nation, America has become a land of travelers, cities have spread out into suburbs and--what do we do about automobile accidents? Men, women, and children are being killed by automobiles faster than by artillery shells or airplane bombs. What can be done? What is the solution? This is social science fiction.
>
> ... Keep in mind the fact that social science fiction is not easy to write. It is easy to predict an automobile in 1880; it is very hard to predict a traffic problem.

6 Ketterer, p. 98.

7 Krysmanski, pp. 84, 89.

8 Ibid., p. 90.

9 Definition by Sturgeon, quoted by Blish, in: Clareson, p. 167.

10 cf. Knight, p. 1.

11 Rottensteiner, in: Polaris 1, p. 139.

12 Heinlein, in: Davenport, p. 36.

13 cf. Suvin, in: Barmeyer, p. 103.

14 cf. Wollheim, pp. 16-18.

15 Bölsche, p. 318.

16 cf. Átheling, p. 118.

17 Pierre Versins, Encyclopédie de l'Utopie, des Voyages extraordinaires et de la Science-Fiction (Lausanne, 1972), p. 515.

18 Rottensteiner, in: Polaris 1, p. 162.

19 Erich Lasswitz, "Vorwort des Herausgebers," in: Kurd Lasswitz, Auf zwei Planeten (Donauwörth, 1948), p. 5.

20 Most of the English chapter "Ideals" already includes the next German chapter (cf. II, 86-99 and E 197-203).

21 Altogether there exist four abridged editions of Auf zwei Planeten but none is available on the market right now: 1) ed. Erich Lasswitz (Donauwörth: Verlag Cassianeum, 1948), 326 p.; 2) (Berlin: Gebrüder Weiss, 1959), 313 p.; 3) ed. Burckhardt Kiegeland and Martin Molitor (Frankfurt/Main: Verlag Heinrich Scheffler, 1969), 350 p.; 4) (München: Heyne Verlag, 1972), 208 p.

III. SUMMARY

1 cf. Ketterer, p. 23.

2 Wollheim, "Introduction," in: Lundwall, p. 8.

3 Kretzmann, p. 423, footnote 21.

4 Ibid., p. 417.

5 Ibid., p. 427.

6 Hillegas, "Afterword," in: Two Planets, p. 383.

7 Rottensteiner, in: Clareson, p. 289.

P.S. Besides Gernsback, another writer took ideas from Lasswitz' Bilder aus der Zukunft: the Swede Claes Lundin in his novel Oxygen och Aromasia (1879) with the subtitle "Bilder från år 2378, efter en främmande idé" (images from the year 2378, following a foreign idea"). It is Lundwall (pp. 43-45) who mentions this "delightful Utopian novel" which "was written five years before Hugo Gernsback...even was born," apparently without knowing that the ideas were taken from Lasswitz' story: "Bis zum Nullpunkt des Seins: Erzählung aus dem Jahre 2371"!

BIBLIOGRAPHY

A. LITERATURE ABOUT SCIENCE FICTION

Aldiss, Brian. Billion Year Spree: The History of Science Fiction. London: Corgi Books, 1975[2].

Amis, Kingsley. New Maps of Hell: A Survey of Science Fiction. New York: Harcourt, Brace and Co., 1960.

Atheling, William, Jr. (pseudonym of James Blish). More Issues at Hand. Chicago: Advent: Publishers, Inc., 1970.

Barmeyer, Eike, ed. Science Fiction: Theorie und Geschichte. München: Wilhelm Fink Verlag, 1972.

-- articles used for reference:

- Blish, James. "Nachruf auf die Prophetie," pp. 118-128.
- Franke, Herbert W. "Literatur der technischen Welt," pp. 105-118.
- Hahn, Ronald M. "Wissenschaft & Technik = Zukunft," pp. 219-243.
- Suvin, Darko. "Zur Poetik des literarischen Genres Science Fiction," pp. 86-105.

Bretnor, Reginald, ed. Modern Science Fiction: Its Meaning and Its Future. New York: Coward-McCann, Inc, 1953.

-- articles used for reference:

- Asimov, Isaac. "Social Science Fiction," pp. 157-196.
- Campbell, John W., Jr. "The Place of Science Fiction," pp. 3-22.
- Clarke, Arthur C. "Science Fiction: Preparation for the Age of Space," pp. 197-220.

Clareson, Thomas D., ed. SF: The Other Side of Realism: Essays

on Modern Fantasy and Science Fiction. Bowling Green, Ohio: Bowling Green University Popular Press, 1971.

-- articles used for reference:

- Blish, James. "On Science Fiction Criticism," pp. 166-170.
- Hillegas, Mark R. "Science Fiction as a Cultural Phenomenon: A Re-evaluation," pp. 272-281.
- Rottensteiner, Franz. "Kurd Lasswitz: A German Pioneer of Science Fiction," pp. 289-306.

Davenport, Basil, ed. The Science Fiction Novel: Imagination and Social Criticism. Chicago: Advent: Publishers, Inc., 1969[3]; unrev. ed. of 1959.

-- articles used for reference:

- Heinlein, Robert A. "Science Fiction: Its Nature, Faults and Virtues," pp. 14-48.
- Kornbluth, C. M. "The Failure of the Science Fiction Novel as Social Criticism," pp. 49-76.

Gattégno, Jean. La science-fiction. "Que sais-je?" no. 1426. Paris: Presses universitaires de France, 1971.

Graaf, Vera. Homo Futurus: Eine Analyse der modernen Science-fiction. Hamburg und Düsseldorf: Claassen Verlag, 1971.

Ketterer, David. New Worlds for Old: The Apocalyptic Imagination, Science Fiction, and American Literature. Garden City, New York: Anchor Press/Doubleday, 1974.

Knight, Damon. In Search of Wonder: Essays on Modern Science Fiction. Chicago: Advent: Publishers, Inc., 1967[2], rev. ed.

Krysmanski, Hans-Jürgen. Die utopische Methode: Eine literatur- und wissenssoziologische Untersuchung deutscher utopischer Romane des 20. Jahrhunderts. Köln und Opladen: Westdeutscher Verlag, 1963.

Lundwall, Sam J. Science Fiction: What It's All About. (Translated and revised by author from original Swedish edition of 1969.) New York: Ace Books, 1971.

Moskowitz, Sam. Explorers of the Infinite: Shapers of Science Fiction. Cleveland: Meridian Books, The World Publishing Company, 1963, unrev. ed. of 1957.

Nagl, Manfred. Science Fiction in Deutschland: Untersuchungen zur Genese, Soziographie und Ideologie der phantastischen Massenliteratur. Tübingen: Tübinger Vereinigung für Volkskunde e. V., 1972.

Pehlke, Michael und Lingfeld, Norbert. Roboter und Gartenlaube: Ideologie und Unterhaltung in der Science-Fiction-Literatur. München: Carl Hanser Verlag, 1970.

Sadoul, Jacques. Histoire de la science-fiction moderne (1911-1971). Paris: Editions Albin Michel, 1973.

Suvin, Darko, ed. Other Worlds, Other Seas. New York: Berkley Publishing Corporation, 1970.

Versins, Pierre. Encyclopédie de l'Utopie, des Voyages extraordinaires et de la Science-Fiction. Lausanne: Editions L'Age d'Homme, 1972.

Wollheim, Donald A. The Universe Makers: Science Fiction Today. New York: Harper & Row, Publishers, 1971.

B. WORKS BY KURD LASSWITZ

Auf zwei Planeten. Leipzig: Verlag von B. Elischer Nachfolger, n. d. [1905], 7. und 8. Tausend, 2 vols.

Bilder aus der Zukunft. Fürth: Bleymehl, 1964.

1) "Bis zum Nullpunkt des Seins: Erzählung aus dem Jahre 2371" (1871),

2) "Gegen das Weltgesetz: Erzählung aus dem Jahre 3877" (1877).

Empfundenes und Erkanntes. (Edited by Hans Lindau.) Leipzig: B. Elischer Nachfolger, n. d. [1920].

-- used for reference:

- "Der tote und der lebendige Mars" [1910?], pp. 175-185.
- "Die entflohene Blume: Eine Geschichte vom Mars" (1910), pp. 241-247.
- "Humor und Glauben bei Gustav Theodor Fechner (Dr.

Mises)" (1893), pp. 197-232.
- "Unser Recht auf Bewohner anderer Welten" (1910), pp. 163-174.

Seifenblasen: Moderne Märchen. Berlin: Emil Felber, 1901[3].
-- used for reference:
- "Apoikis" (1882), pp. 60-77.
- "Selbstbiographische Studien" (1887), pp. 274-288.

Two Planets. (Abridged by Erich Lasswitz, translated by Hans-H. Rudnick.) New York: Popular Library, 1971.

"Ueber Zukunftsträume," in: Die Nation: Wochenschrift für Politik, Volkswirthschaft und Litteratur. Berlin: Kommissions-Verlag von H. S. Hermann, 13. und 20. Mai 1899; Nr. 33 und 34, pp. 466-469, 480-483.
- also in: Wirklichkeiten: Beiträge zum Weltverständnis. Leipzig: B. Elischer Nachfolger, n. d. [1920][4]; pp. 403-424.

C. LITERATURE ABOUT KURD LASSWITZ

Anonymous. "Der technische Chiliasmus in der neueren Dichtung," in: Quarber Merkur 14, Dezember 1967, 5. Jg., Nr. 4, pp. 3-10; reprint from: Grenzboten, 1898, 57. Jg., 3. Vierteljahr, pp. 499 ff.

Bölsche, Wilhelm. "Das Märchen des Mars," in: Vom Bazillus zum Affenmenschen: Naturwissenschaftliche Plaudereien. Jena: Eugen Diederichs, 1906[4], pp. 301-321; revised version of: "Naturwissenschaftliche Märchen," in: Neue Deutsche Rundschau, 1898, 9. Jg., 1. und 2. Quartal, pp. 504-514.

Debus, Karl. "Weltraumschiffahrt, ein poetischer Traum und ein technisches Problem der Zeit," in: Hochland. Kempten: Kösel'sche Buchhandlung, 1927, pp. 356-371.

Hillegas, Mark R. "Afterword," in: Kurd Lasswitz, Two Planets. New York: Popular Library, 1971, pp. 375-383.

Kretzmann, Edwin M. J. "German Technological Utopias of the Pre-War Period," in: Annals of Science: A Quarterly Review of the History of Science since the Renaissance. London: Taylor and Francis, Ltd., October 15, 1938; vol. 3, no. 4, pp. 417-430.

Lasswitz, Erich. "Vorwort des Herausgebers," in: Kurd Lasswitz, Auf zwei Planeten. Donauwörth: Verlag Cassianeum, 1948.

Lietzmann, W[alther]. "Zur Einführung," in: Kurd Lasswitz, Die Welt und der Mathematikus. (Edited by W. Lietzmann.) Leipzig: B. Elischer Nachfolger, 1924, pp. 3-7.

Lindau, Hans. "Kurd Lasswitz," in: Kurd Lasswitz, Empfundenes und Erkanntes. Leipzig: B. Elischer Nachfolger, n. d. [1920], pp. 1-56.

Pissin, Raimund. "Kurd Lasswitz," in: Die Nation: Wochenschrift für Politik, Volkswirthschaft und Litteratur. Berlin: Kommissions-Verlag von H. S. Hermann, 3. Dez. 1904, Nr. 10, pp. 153 ff.

Poggendorff's biographisch-literarisches Handwörterbuch der Geschichte der exacten Wissenschaften. (Edited by Dr. B. W. Fedderson and Prof. Dr. A. J. von Oettingen.) References to "Lasswitz, Kurd." Leipzig: Verlag von Johann Ambrosius Barth, 1898, vol. 3, p. 779 and 1904, vol. 4, p. 842.

Rottensteiner, Franz. "Kurd Lasswitz: A German Pioneer of Science Fiction," in: SF: The Other Side of Realism: Essays on Modern Fantasy and Science Fiction, ed. Thomas D. Clareson. Bowling Green, Ohio: Bowling Green University Popular Press, 1971, pp. 289-306.
- revised version:
"Ordnungsliebend im Weltraum: Kurd Lasswitz," in: Polaris 1: Ein Science Fiction Almanach, ed. Rottensteiner. Frankfurt: Insel Verlag, 1973, pp. 133-164.

For further reference on literature about Kurd Lasswitz cf. Franz Rottensteiner, "Bibliographischer Anhang" of "Kurd Lasswitz: Ein Versuch einer kritischen Biographie," in: Quarber

Merkur 11, 1967, 5. Jg., pp. 57-61.

D. OTHER WORKS OF REFERENCE

Anonymous. "Elefantentigerziegendrache," in: Die Welt. Hamburg: Axel Springer Verlag, 18. Nov. 1975, Nr. 269, p. 20.

Asimov, Isaac. Asimov's Guide to Science. New York: Basic Books, Inc., 1972.

Carter, Lin. Imaginary Worlds: The Art of Fantasy. New York: Ballantine Books, Inc., 1973.

Clarke, Arthur, C. Report on Planet Three and Other Speculations. London: Corgi Books, 1975[2].

------. The Making of a Moon: The Story of the Earth Satellite Program. New York: Harper & Brothers, Publ., 1957.

Copleston, Fredrick, S. J. A History of Philosophy. Garden City, New York: Image Books, A Division of Doubleday & Company, Inc., 1965; vols. 6 and 7.

Däniken, Erich von. Erinnerungen an die Zukunft. München: Droemer Knaur, 1968.

-------. Meine Welt in Bildern. München: Droemer Knaur, 1975.

Ley, Willy. Rockets, Missiles and Men in Space. New York: The Viking Press, 1968.

Lowell, Percival. Mars. Boston and New York: Houghton, Mifflin and Company, 1895.

Shelley, Mary. Frankenstein: or, The Modern Prometheus. New York: Airmont Books, 1963.

Shklovskii, Iosef S. and Sagan, Carl. Intelligent Life in the Universe. New York: A Delta Book, 1966.

Sulzberger, C. L. "This Is The World That Is," in: The New York Times. New York: New York Times Co., July 14, 1974; section 4, p. 17.

Thomas, Davis, ed. Moon: Man's Greatest Adventure. New York: Harry N. Abrams, Inc., n. d. [1970].

LASSWITZ' MAJOR WORKS
(arranged chronologically)

A. IN LITERATURE

Bilder aus der Zukunft. 1) "Bis zum Nullpunkt des Seins: Erzählung aus dem Jahre 2371," 2) "Gegen das Weltgesetz: Erzählung aus dem Jahre 3877" (written in 1871 and 1877). Breslau: Schottländer, 1878, 88 and 171 p.

Schlangenmoos. (Novelette published under pseudonym Velatus.) Breslau: Schottländer, 1884, 267 p.

Seifenblasen: Moderne Märchen. (Short stories written between 1878 and 1893.) Hamburg: Voss, 1890, 261 p.; 2nd enlarged ed. Weimar: E. Felber, 1894, 291 p.

Auf zwei Planeten. (Novel written between 1895 and 1897.) Weimar, Berlin: E. Felber, 1897, 2 vols., 421 and 545 p.

Nie und Immer. 1) "Traumkristalle: Neue Märchen," 2) "Homchen: Ein Tiermärchen aus der oberen Kreide." Leipzig: E. Diederichs, 1902, 337 p.; 2nd enlarged ed. Leipzig: B. Elischer Nachfolger, 1907, 2 vols., 205 and 207 p.

Aspira: Der Roman einer Wolke. Leipzig: B. Elischer Nachfolger, 1905, 265 p.

Sternentau: Die Pflanze vom Neptunsmond. Leipzig: B. Elischer Nachfolger, 1909, 377 p.

Empfundenes und Erkanntes. (Posthumous volume of poetry and prose, ed. by Hans Lindau.) Leipzig: B. Elischer Nachfolger, 1920, 312 p.

Die Welt und der Mathematikus: Ausgewählte Dichtungen. (Containing stories from Seifenblasen, Nie und Immer and Empfundenes und Erkanntes as well as a few poems, ed. by W[alther] Lietzmann.) Leipzig: B. Elischer Nachfolger, 1924, 92 p.

B. IN PHYSICS AND PHILOSOPHY

Über Tropfen, welche an festen Körpern hängen und der Schwerkraft unterworfen sind. (Doctoral thesis.) Breslau: Koebner, 1873, 76 p.

Atomistik und Kriticismus: Ein Beitrag zur erkenntniss-theoretischen Grundlegung der Physik. Braunschweig: Vieweg & Sohn, 1878, 111 p.

Die Lehre Kants von der Idealität des Raumes und der Zeit. (Prize-winning work.) Berlin: Weidmann'sche Buchhandlung, 1883, 246 p.

Geschichte der Atomistik vom Mittelalter bis Newton. Hamburg: Voss, 1890, 2 vols., 518 and 609 p.

Gustav Theodor Fechner. Stuttgart: F. Frommann, 1896, 207 p.; 3rd rev. ed. 1910.

Wirklichkeiten: Beiträge zum Weltverständnis. Leipzig: B. Elischer Nachfolger, 1900, 444 p.

Seelen und Ziele: Beiträge zum Weltverständnis. Leipzig: B. Elischer Nachfolger, 1908, 320 p.

Also: different lectures and essays published by B. Elischer Nachfolger or in various scientific and philosophical journals (cf. J. C. Poggendorff's biographisch-literarisches Handwörterbuch zur Geschichte der exacten Wissenschaften, ed. by Dr. B. W. Fedderson and Prof. Dr. A. J. von Oettingen, Leipzig, Verlag von Johann Ambrosius Barth, 1898, vol. 3, p. 779 and 1904, vol. 4, p. 842.)

For further reference on contents and different editions of Lasswitz' works cf. Franz Rottensteiner, "Bibliographischer Anhang" of "Kurd Lasswitz: Ein Versuch einer kritischen Biographie," in: Quarber Merkur 11, 1967, 5. Jg., pp. 57-61.